Diffusion and Impact of E-Commerce: The French Specific Path

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SUMMARY

- According to most indicators, the use of the Internet and the development of e-commerce (over the Internet) in France is below the level that should be reached given the French level of development.
- French indicators of the digitization of the economy and the society are not lower because French users are less intensive users of digital technologies, but because there are fewer users in France. There are fewer users in France because there are fewer incentives to adopt the new technological base since the low rate of adoption generates low positive network externalities for new users, therefore delaying adoption.
- In France, Internet adoption results from the adaptation of applications that were run by traditional EDI systems, for B2B, or by Minitel based systems for B2C. This pre-existing technological basis delayed adoption, and French e-commerce continues to be more intense users of traditional digital technologies.
- French adopters tend to implement web applications that are more sophisticated and more integrated with the company information system than foreign firms do. This raises Internet and related business practices adoption costs, and therefore also delays adoption.
- French firms tend to prefer implementing technologies that support coordination and cooperation rather than online transactions, since they consider face-to-face interactions essential for buying and selling. This is another reason for the low level of online sales.
- This general trend is reinforced in B2C by the low diffusion of the Internet among non professional users and by the efficiency of the French distribution system.
- In addition, there are specific industry biases that hindered the development of B2C e-commerce:
  - Major retail chains identified the Internet as a marketing channel that could cannibalize their traditional channels. Due to their competitive strength, they have been able to deter pure player entry into B2C, and to provide their consumers with efficient services that mimic the advantages of online ordering (e.g. at home delivery).
  - Banks did not push the development of online service because they also feared the cannibalization of their existing dense distribution networks that combines branches and ATMs.
- In the case of B2B, two sectoral biases played a role:
  - In the 1970's, the regulatory environment led banks to develop an efficient computer based clearing system. This base prevented the development of EFT, and resulted in a barrier for B2B online transactions, since payment could not be easily carried out by online means.
  - The French manufacturing industries identify digital networks as a means of deepening the efficiency of already established cooperative links among companies. They did not invest in the development of electronic marketplaces and digital systems to support transactions.
- French firms do not implement trade oriented Internet applications, but they implement coordination oriented applications. Therefore, it is not surprising that they do not consider the same barriers of adopting the e-business technique as foreigners would. In particular, the security of online transactions is not a major issue for the French.
- Not surprisingly, e-commerce generates specific impacts in France. It does not impact sales volume and procurement costs, but it enhances internal processes and inter-firm coordination.

INTRODUCTION

France was an early adopter of e-commerce in the 1980's. It developed both B2B and B2C e-commerce systems on the basis of specific technologies, EDI and the Videotext (marketed as The Minitel), respectively (Brousseau, 2001, 2003; Brousseau and Kraemer, 2002, 2003). When the Internet became available for commercial application in the mid-1990's, French citizens and firms did not recognize it as an advantageous tool compared to older technologies. They delayed adoption of the Internet and related e-commerce and e-business practices. Due to the impressive wave of innovation that accompanied the worldwide development of the Internet, France switched to the Internet by 1998. The combination of this late adoption of the Internet and of the early adoption of e-commerce methods led France to embrace a very specific path of development of e-commerce that is characterized in this paper.

The paper is based on previous comparative analyses of the French behavior in the adoption of IT, reorganization and globalization of the industry, and public policies in favor of the Internet (Brousseau, 2001, 2003; Brousseau and Kraemer, 2002, 2003). These were based on comparative statistical analyses of public data about the economic climate, the organization and performance of French firms, the development of e-commerce and the diffusion of IT in various countries. This paper completes these early analyses thanks to a firm level survey aimed at gathering detailed data on a sample of 200 firms in 10 different countries. This paper focuses on the analysis of the French sample. This sample is also compared in detail with two other samples of 200 firms in Germany and Denmark. Comparing France with two countries that have similar levels of development and that belong to the same Regional Union is a good way to get a better understanding of the specific path of French development and its causes.

In Europe, two quite contrasted paths of adoption can be identified when France is compared with Denmark. In France, Internet adoption resulted from the adaptation of applications that were run by traditional EDI systems, to applications operating on the basis of Web EDI, especially in the manufacturing industries. This explains a specificity of the French adopters: they implement web applications that are more sophisticated and more integrated with the company information system than foreign firms do. Therefore, implementing web applications tends to be costlier in France. Since potential adopters have to deal with established systems that remain efficient, switching costs tend to delay the adoption of Internet-based B2B operations. This prevents firms from adopting e-business practices that are linked everywhere else to Internet-based e-commerce: buying and selling online. In addition to switching costs, French firms prefer to coordinate and cooperate online rather than to buy and sell online, since they see these latter operations as requiring face-to-face interactions. This general trend that applies in particular to B2B is reinforced by the fact that French firms do not face a strong demand to develop B2C e-commerce channels, because households are poorly equipped with Internet access (compared to the Danish) and because the distribution system in France is quite efficient.

In contrast, Internet adoption is more homogeneous and stronger in Denmark. Most e-business practices, including EDI, rely on Internet-related technologies and the Danish adopted a wide range of associated e-business practices, including online transactions. The demand for online services is much stronger. In particular, the bank and finance industry largely adopted online technologies and strongly developed EFTs. The specific French banking regulation explains why France did not follow the same path, and it is clear that this difference plays a role in hindering France in the development of B2B online transactions (while B2C benefits from a wide diffusion of credit cards).

Our data set enables us to get a better understanding of the specific paths of development of e-commerce in various industries. There is a strong relationship between the nature of traded goods and services and the type of commercial operations performed online. Goods that can easily be digitized are more likely to be traded online. That is why banking and financial services are likely to be provided to customers online. In contrast, tangible goods are less likely to be distributed through B2C online systems. In manufacturing industries, e-business techniques are primarily used to support the performance of B2B operations.

The combination of these "activity" biases and of the specific features of the related industries in France can also explain the specific path of French development.

- In France the distribution industry is both efficient and highly concentrated. Major retail chains identified the Internet as a marketing channel that could cannibalize their traditional channel. Due to their competitive strength, they were both able to deter entry by pure players into B2C, and to provide their customers with efficient services that mimic the advantages of online ordering (e.g. at-home delivery).

- The finance industry did not push the development of online services due to the aforementioned regulatory specificities, and the efficiency and density of their physical distribution networks (combining branches and ATMs).

Both industry specificities explain why B2C did not really develop in France.

On the other hand, the globalization of the French manufacturing industry led French firms to develop more efficient B2B operations to enhance its international competitive position, mainly by coordinating more efficiently with business partners. This is why the French B2B focuses mainly on the support of cooperative links among firms (in the spirit of EDI systems[1]) and not on the online performance of transactions (as with the case of marketplaces).

The nature of industries does not explain all. Behavioral patterns matter as well. Indeed, German firms also seek to enhance inter-firm cooperation and to reduce supplying and selling costs. Therefore, they focus both on online coordination systems and on online transaction applications. Danish firms also identify the Internet as a means of developing sales. Therefore, they tend to sell online.

These behavioral biases seem to be linked to a perception of the nature of barriers to online commerce that evolve with the experience of trading online. Before selling online, most firms consider that institutional barriers prevent them from doing so. When they decide to trade online, the perceived barrier becomes the cost of reengineering business processes. When firms are more intense users of e-business techniques, the only barrier that can still be perceived is the fact that in some cases, the goods traded by the firms are not adapted to online sales, especially since they require face-to-face meetings, or need to be displayed in

[1] As pointed out in Brousseau (1994), EDI requires interchange agreements among firms. These agreements are generally part of wider agreements by which firms implement long-term cooperative relationships. They first agree on the frame of this relationship. This allows them to make the specific investment required to mutually adapt their inbound and outbound operations. Then, they use digital networks to perform transactions. However, these transactions take place in the frame of these pre-established cooperative relationships. This is quite different from the logic of online marketplaces. In that case, digital networks are used to allow customers to identify providers and to settle an agreement online. In that later case, digital network supported spot-markets (as those that exist for raw materials or office supplies), while EDI systems were more likely to support long term cooperative relationships (as subcontracting of franchising relationships).

physical locations for inspection. It might be that the differences of behavior among nations may simply reflect the difference of e-commerce maturity, due to the fact that e-commerce is less developed in some countries than in others. Consequently, potential adopters in these countries with a low intensity of e-commerce perceive more barriers to adoption, therefore delaying it.

This behavioral effect reinforces another effect documented in our earlier paper: the low level of increasing return of adoption in countries with low levels of adoption. In these countries and industries where there are fewer users of e-commerce techniques, adopters now would not benefit from strong positive effects. They would have to continue to perform most of their operations the traditional way since most of their business partners are not coordinating or trading online. Consequently, a vicious circle delays adoption. This circle becomes virtuous when the rate of adoption is above a ceiling. However, for the time being, France remains clearly behind this limit.

BACKGROUND AND A PRIORI EXPECTATIONS

General Approach

Earlier papers (Brousseau, 2001, 2003; Brousseau and Kraemer, 2002, 2003) have pointed out that the path of e-commerce development in France is specific compared to what happened in most of the other developed countries.

One of the main causes of this specificity is the late adoption of the Internet and related technologies. This lateness is due, first, to the early and wide adoption of alternative technologies: the Minitel and EDI. It led the French to perform e-commerce on alternative platforms, but prevented them from benefiting from the strong wave of innovation from 1995-2000. The second cause of the late adoption is that until the very late 1990s, the Internet revolution was not considered a priority by the government and most business decision makers, because France had to modernize its economy before going digital. Investments in ITCs and the reengineering of many business processes contributed to the preparations for France's digitization. However, the digital take-off was too late to allow France to catch up with most countries with the same level of development. The bursting of the Internet bubble dried up the capital market and ruined enthusiasm too early in the Internet and e-commerce adoption processes.

In addition, several digital divides among the most educated, the less educated, the Paris region, the French "provinces," large firms and SMEs, and modern and archaic industries, characterize France. These divides are clear inhibitors of e-commerce since they check adoption of both digital technologies and e-commerce. Since many potential users and businesses cannot interact digitally with others that are not digitized, many decide to delay adoption.

Both factors inhibited e-commerce development. At the same time, positive factors have developed that should favor the development of e-commerce:

- First, the French production system is now composed of firms and industries whose organization allows the implementation of e-business and e-commerce practices. Innovation capabilities have been reinforced, especially in IT. Moreover, France benefits from digital skills both in terms of IT production and use. It has a tradition in producing efficient telecommunication equipment and services, as well as software. The early diffusion of online services, both in businesses and in the public; the

generalized use of smart-cards and mobile phones by the public; and the relatively high-rate of EDI usage and online information exchanges by businesses combine to create a climate that is favorable to the development of e-commerce.

- Second, the French economy is now quite liberalized and open to foreign competition. Business decision-makers are aware of what is happening abroad and seek to implement similar business processes in France.

- Third, the enabling infrastructure for e-commerce is apparent. France benefits from an excellent logistic, legal and business service infrastructure. Most of the barriers that made Internet access scarce and costly (by 1997) have now been removed. There are also a few French firms that have developed viable (and sometimes profitable) e-commerce operations. In many cases, e-commerce companies are subsidiaries of retail chains that are quite successful in the global market.

- Fourth, the central government, which has a strong influence both because of the importance of the State in the national economy, and because of the centralization of the country, implemented a strong policy to boost the development of a French information society and digital economy. This policy was reinforced by the European policy aimed at sustaining the development of a unified and dynamic European digital arena.

In addition, some other factors play a more specific role in each of the e-commerce segments:

- In the B2B market, several factors were drivers for the adoption of new business practices. The modernization of the French industry made it more flexible, more internationalized, and more accustomed to competition. Second, while late, telecommunication operators together with the information services providers developed an efficient supply of consultant or ready-to-use online services. Both drivers favored the adoption of new methods of business and commerce by French firms, and especially the largest, which are more internationalized, more subjected to international competition, more able to afford these services and more digitally skilled. At the same time, these large organizations were often part of the French National System of Innovation that was not well adapted to the decentralized process of innovation at the heart of the Internet Revolution. Moreover, few start-ups were really able to develop. This hindered the development of B2B practices since innovation occurred only in industries in which dominant firms cumulate the technical expertise and the financial ability to sustain innovation. These industries were motivated to go digital because of the international competition.
- On the B2C segment, the availability of several platforms in addition to the Internet (Minitel, but also mobile telephony and digital TV) partly compensates for the low level of diffusion of the Internet. It can sustain the development of multi-channel e-commerce systems in which fixed costs (database design and maintenance, security, advertising) are written off on different and complementary markets. Moreover, synergies can exist among channels. However, the poor equipment of households is clearly an inhibitor since the potential clientele is still too tiny to write off most necessary investments for firms to go online. Another factor playing a strong role as an inhibitor is the efficiency of the existing distribution channels that are quite competitive in terms of costs, and well distributed over the French territory. Online merchants of physical goods hardly compete with these channels, except in some niches.

On the basis of these earlier analyses, we therefore expect to:

- Measure a lower level of development of Internet supported e-commerce in France than in other countries with the same level of development.
- Have a greater propensity of French firms relying on non-Internet based technology to perform e-business operations. As comparisons cannot be based on the Minitel that is a pure French technology, we expect to see a higher propensity of French businesses using the traditional EDI technologies than their foreign counterparts.
- French consumers tend to be less likely drivers for e-commerce than consumers in other countries since they are poor users of the Internet, and since they already benefit from online services though the Minitel.
- Observe a wider digital divide among large and small firms and among industries in France than in other countries.
    - Large firms should be more intensive users of digital technologies to perform various operations related to e-commerce.
    - Small firms are expected to be less intensive and less sophisticated users of digital technologies.
- Observe a greater adoption of e-businesses practices and a wider development of e-commerce in firms and industries that are more open to foreign competition.
- Exhibit the role of the government and of the Institutional Environment on the pace of adoption of e-business practices.

Given our earlier investigations, some conjectures are less clear to make:

- The firms that were the early adopters of information technologies and the early developers of online services should have been the early adopters of the Internet and related technologies since they benefited both from their digital literacy and investments to reengineer their information system and businesses processes. At the same time, it is not clear whether these earlier investments prevented them from switching to the new technology.
- Whether large firms should switch more rapidly than small firms to e-commerce remains unclear. On the one hand, large firms benefit from more digital skill. On the other hand, organizational change is easier to manage in small firms. One can expect that the various types of firms will identify contrasted barriers to e-commerce. Small firms are expected to identify technology and cost as main inhibitors, while large firms are expected to identify organizational changes as their main inhibitor.
- Moreover, the difference of e-commerce practices between large and small firms can be influenced by their degree of involvement in international competition. Due to the specific concentration of the French industry around national champions and to the peculiarities of the French National System of innovation, one can expect that large internationalized firms, frequent in manufacturing industries (especially in the manufacturing of equipment, transportation means and infrastructure), are more likely to adopt B2B practices than large firms that operate at the national level only. The latter, mainly in the service industry, should be less digitized than similar foreign firms.

Sectoral Approach

The French economy is one of the most service intensive economies in Europe, although it is far from the U.S. in that respect. However, for the last two decades, France deepened its

specialization in services (Brousseau & Kraemer, 2002). The growth of commercial services was faster than the growth of the whole economy, while the contribution of agriculture and manufacturing industries to GNP decreased. Faster growth occurred for professional services, commerce, and transportation. The French industry switched to a modern organization of operations based on the externalization of many functions to specialized professionals that led to the development of network firms. It also developed skills in new industries that are essential in the "new economy," namely commerce, logistics, and transportation. Public services grew a little faster than GDP, but this was mainly due to the effort toward education and to the mechanistic growth of health expenditures with the aging population. Manufacturing, on average, grew at a slower pace than the economy, with two industries experiencing strong growth: equipment and intermediary products.

This evolution of the French industry partly explains why it became more digitalized. The modernization of the organization of operations led firms to implement IT to control more flexible processes and to manage the complex coordination processes required by flexible specialization. At the same time, it also explains why some differences can be observed among industries. Indeed, this modernization of operations did not affect the various industries the same way. Several factors can be mentioned. Some are general factors, such as the average company size or the degree of globalization, which affects various industries differently. Others are factors that are specific to some industries.

As pointed out in Brousseau & Kraemer (2002), firm size matters in the case of France. French industry is divided between large internationalized firms and small local companies, while there are dense webs of SMEs active on the global market in Germany and Italy. Large companies are more internationalized, more high-tech, and in general, more modern than the network of small companies that are their subcontractors. They employ more skilled workers, use IT more intensively, and are managed similar to most of their global competitors. In contrast, French SMEs often do not go international and do not feel the necessity to use IT intensively. Those that use IT intensively generally work with large clients that pressure them to go digital. This is the case in the mechanical construction industry where French automakers extensively implemented EDI in the late 1980s (Brousseau, 2001). These features are very much dependent on the industry: some industries are mostly composed of small firms (intermediary goods and consumption goods), while others are more concentrated and dominated by large firms (equipment), even very large firms (automotive industries). The latter are more likely to go digital than the former because large firms are generally more digital and they tend to spur their competitors/partners in the industry to adopt IT. There are, therefore, clear contrasts among industries in term of degree of digitization (which is linked to the degree of concentration).

The second factor that affects the degree of digitization of an industry, and that should therefore affect its likelihood to practice e-commerce, is its openness to global competition (Brousseau & Kraemer, 2002). Indeed, one could expect a greater propensity to implement e-commerce in industries whose markets are already global or in which “best business practices” circulates. In that respect, France is a quite open economy. In addition to trade, the international flow of capital has to be taken into account. In general, imports and exports account for about 28 percent of the GDP. The French economy is therefore quite open to foreign competition. France is especially competitive at exporting food and agro-business products, automobile equipment, and commercial and professional services. Those firms that go international have to implement the marketing methods in use in other countries, and one can expect that they play a role in promoting these methods in their domestic market. Tourism also plays an essential positive role in the French trade balance, but of course it does not lead

to an internationalization of firms. The French industries for consumer services and goods consumption are less efficient. Therefore, one should not expect the French firms in these industries to be strong promoters of e-commerce methods. However, at the same time, the strong presence of global firms in these industries should promote the use of e-commerce. FDI statistics show that France, together with the U.K., is one of the most global economies among the larger ones (mechanically small countries are more global than large ones). French firms are used to competing in a global arena and French firms are confronted with competition from foreign subsidiaries on domestic markets. While the FDI is more intensive in manufacturing than in the service industry, statistics point out that French service companies are quite competitive on the international scene.

Given these elements, one can expect that the use of digital technology will be more developed in industries where foreign affiliates are strong local competitors or where French firms are international leaders. The former relates mainly to consumer goods and manufacturing industries, while the latter relates mainly to professional services. The likelihood of foreign firms developing e-commerce is also dependent of the local likelihood of consumers using it (since we are speaking of consumer goods, B2C is the main issue). The ability of French professional service companies to develop B2B can also be inhibited by the low digital skills of French businesses. In fact, since there are contradictory trends, one can first expect a strong contrast among industries, and second, the rise of clusters (B2B practices being developed by firms experiencing the same level of internationalization, and B2C practices being developed by firms targeting their product and services for the digitally literate audience).

The third factor that can generate industry specific effects is the type of products and services provided by the industry (Brousseau, 2001, 2002). It is obvious that with information goods being potentially fully digitized, it is easier to develop e-commerce for those goods and services that are information intensive. But other conditions apply; the less complex a product, the more standardized a good, and the simplest to sell online. Products that differ on a few characteristics from its competitors can be easily described and compared thanks to a large amount of information that is manageable with current technology. Moreover, when standardization occurs, uncertainty about the quality of traded goods is small, and trade is more likely to occur. Given these various elements, strong differences in the rate of e-commerce usage should be expected among industries.

Let us now switch to more specific factors that affect two industries in particular: the French banking and finance industry, on the one hand, and the French retail industry, on the other hand.

While quite competitive in services in general (and in professional services in particular), France performs poorly in banking and finance (B&F). Compared to its main competitors, the French B&F industry suffered from the historically strong state intervention in the economy. For two centuries the government intervened in the economy, either to finance production from the Royal Manufactures of the XVIII century to the Nationalized Companies of the 1980's, or to finance redistribution. Therefore, banks did not become as strong as German ones (both being backed up and backing up manufacturing firms) and financial markets did not develop as in England. French B&F companies are rather weak compared to their foreign competitors. The situation evolved in the past ten years, mainly because a strong concentration occurred, enabling French banks to reach a critical mass and go international. However, the French finance industry remains weak at the international level. Nevertheless, within France, B&F companies' competitive position is strong. First, retail banking remains a

proximity activity where local reputation, physical presence, and in depth knowledge of the clientele matter. Second, the French banks installed a very dense web of local agencies that provide an efficient service to the public. New entrants could hardly compete on the mass market. Third, the French banks cooperated to provide a low cost and efficient debit/credit card system, "*Carte Bleue,*" on which a lot of services are based. In addition, ATMs are available everywhere and provide a 24-hour availability for many banking services. Together, these elements lead the average consumer to see the various French banks as close substitutes and to consider their service/price ratio as being correct. Therefore, they are neither encouraged nor used to changing financial service providers. Moreover, the demand for online banking is low since banks already provide both Minitel and Internet access to their most digitally literate clients. Most branches are extensively and easily accessible, and the French do not use the Internet intensively.

While financial services are easy to digitize and while the finance industry is quite internationalized in general, one can therefore expect a low likelihood of the French finance industry to develop e-commerce, especially in retail banking.

In contrast, the retail industry in France is quite competitive. In the 1960's, the French imported US marketing methods linked to the development of supermarkets and chains of specialized outlets, and adapted it to the specificities of the European urban organization. Moreover, the French government considered modern marketing channels as a means of reducing inflation by cutting useless intermediary fees and by increasing competition. This support has enabled several French companies to become international leaders in several important markets (Table 1).

Table 1: European Leaders in the Retail Industry

Company	Citizenship	Europeans Sales 1999 (Millions of Euros)
Groupe Carrefour	**France**	66,585
Metro AG	Germany	48,899
ITM Entreprise SA	**France**	31,900
Rewe Zentral AG	Germany	31,585
Auchan Centrale	**France**	30,334
Tesco Plc	UK	30,143
Opéra (Casino, Géant…)	**France**	27,693
Aldi Gruppe	Germany	26,286
Edeka Zentrale AG	Germany	25,496
Sainsbury Plc	UK	22,758
Ahold	The Netherlands	22,750
Leclerc	**France**	22,349
Tengelmann Gruppe	Germany	17,22
Wal Mart Stores	USA	16,825
Lidl &Schwartz	Germany	15,883

Source: M+M Planet Retail (2000 data)

This strength paradoxically hindered the development of e-commerce in France. Indeed, these companies are quite efficient (since an intensive competition exists on the domestic market). In particular, they developed a wide set of differentiated outlets that serve the various local markets according to the specificities of the goods and services delivered, and functioning with the structures of the population and the city. Wherever they live, French consumers can easily access retail facilities that provide them with an adequate service. E-retailers did not benefit from a strong competitive advantage and were able to enter niche markets only. Moreover, most of the significant e-retailers are subsidiaries of these large distribution companies. Among the roughly 30 online sellers that were profitable in 2001, less than 10 were pure players, the remaining 20 were all subsidiaries of large firms: either retailers

(Alapage, Fnac.com, Darty.com, etc.), or transportation companies (sncf.com) (Brousseau 2001). These traditional players had to enter the business and serve their customers, while avoiding a "cannibalization" of their traditional channels in which they were already heavily invested. Since the demand of consumers for online retailers was weak, both because of the low-level of Internet adoption and the high quality of the services in the traditional channels, the retail industry did not invest much in the development of enhanced online services. Therefore, traditional distribution companies that consider the Internet an additional channel to market and advertise their products or services, control e-commerce channels. Due to the efficiency of the French model of supermarket or specialized retail chains, online ordering can be developed only in some niches: e.g. CDs in rural areas, groceries for executive women in the region of Paris, etc.

Given these elements, one can expect B2C e-commerce to be significantly less developed in France than in other countries with less efficient distribution systems, despite the strong internationalization of successful French retail firms.[2]

To conclude, one should expect a greater propensity for e-commerce to develop in those industries where large and global firms exist; local firms are challenged by foreign competitors, and output is information intensive.

However, the unwillingness of the French population to use the Internet should heavily hamper the development of B2C e-commerce, even in the above quoted industries. Consequently, the development of e-commerce should be essentially driven by the development of B2C e-commerce in industries open to foreign competitors that are mainly serving professional customers.

Since the present study focuses on the three industries in particular, we should observe them through their own given characteristics:

- A higher propensity of the French manufacturing industry to develop B2B e-commerce, even though this general propensity should be stronger in other countries due to the fact that the manufacturing industries are poorly internationalized (consumer goods). This should lead us to identify a cluster of manufacturing firms that are intensive users of IT, distinct from other groups of less intense users.
- A low propensity of the French distribution and banking and finance industries to develop B2C.

[2] The idea that the French distribution industry is efficient as compared to its foreign counterparts relies on the idea that it is well managed and well organized, resulting in an ability to provide customers with low cost service that they request, given their diversity and their spatial distribution. It is impossible to provide the reader with a synthetic statistical indicator of this. The efficiency of the French management model is attested by the successful internationalization of French distribution companies (Table 1). The efficient organization of the French system is largely linked to the concentration of the industry. Large multi-channel groups employ 60% of the workforce in the distribution industry. Marketing methods and their financial strength allow them to optimize the distribution of (specialized or multi-products) outlets given the spatial distribution of the population and of their commercial targets. Indeed, since most of the groups operate different marketing channels corresponding to horizontally and vertically diffentiated distribution services, they can locate them harmoniously and optimize their discrimination strategy. As a result, most of the French consumers benefit in their neighborhood from the distribution services that are characteristics of the socio-economic profile that is dominant in the area. They often have low incentives to buy online or to benefit from a service that would not be available in their own neighborhood. In many countries, the spatial organization of the distribution system is often less optimized because the industry is less concentrated. Moreover, regulations can prevent the distribution industry from operating as efficiently as it could. For instance, in Germany, restrictive regulations of opening hours prevent the distribution companies from providing their customers with extended time availability of their services.

- In addition, it has to be pointed out that these three industries, and in particular the more dynamic segment of the manufacturing industries, like the automobile industry, developed their own quite efficient non-web based EDI systems in the 1980's (Brousseau 2001). This should lead these three industries to be less intense users of web-based B2B than their foreign competitors.

METHODS

Sources and Data

This paper is part of a study of the globalization of e-commerce in ten countries. The research employs a mix of quantitative and qualitative methods, and levels of analysis (country, industry, and firm). The present paper relies on several combined sources:

- Secondary data and literature review that were developed in two earlier papers (Brousseau, 2001; Brousseau & Kraemer, 2002) that helped to elaborate earlier stated expectations and the analysis of the French specific path of development of e-commerce that lies behind them.
- Interviews and field study that enabled us to perform in depth case studies of the development of e-commerce in France in three specific industries: retailing, apparel and fashion, computers.
- A specific firm level survey by industry sector and firm size that allow proceeding to statistical analysis and econometric testing.

The core of the paper is based on this last data-set which enables us to check our expectations and give a more refined analysis of the behavior of firms regarding e-commerce adoption and impact.

Data was gathered through a telephone survey of 2,139 establishments in 10 countries, (Brazil, China, Denmark, France, Germany, Japan, Mexico, Singapore, Taiwan, and the United States), that use the Internet to buy, sell, or support products and services. Data collection took place from February to April 2002. A stratified random sample was used; drawing from company lists representative of each local market and stratified by industry and firm size within each country. The sample frame was obtained from a list source representative of the entire local market, regardless of computerization or web access. However, interviews were conducted only with companies that made use of the Internet in conducting its business. The overall response rate was 13%. Response rates varied by country, ranging from 8% to 39%. Establishments were selected from three major industry sectors that are known to be more advanced users of e-commerce: manufacturing, distribution (wholesale and retail), and finance (banking and insurance). The sample breaks down into approximately 300 establishments in the U.S. and 200 in each of the other countries, and is evenly split by industry as well as firm size (from 25 to 250 and 250 or more employees) in each country. Respondents were primarily CIOs, CEOs, or IS managers who were responsible for making the firm's IT-related decisions.

Essentially, this paper focuses on the French case. However, it tries to contrast it with two other European countries: Germany and Denmark. In addition, we rely on the global analysis of the global sample (Kraemer, Gibbs, Dedrick, 2002) and on the other case studies that analyze both the general and the specific lessons that can be drawn from the French case. The Danish, French and German samples are all made up of 200 firms. They resulted from a survey process in which the response rate was quite contrasted, 18% for Denmark, versus 9% and 8% for France and Germany, respectively.

The establishment (site) was the sampling unit and is the unit of the database. An establishment is defined as the physical location. The sampling was a stratified random sample; stratified by size (large– 250 or more employees — and small — between 25 and 249 employees) and by industry (manufacturing- SIC 20-39, wholesale/retail distribution- SIC 50-54,56-57, 59; and banking & insurance- SIC 60-65). Eligible respondents were the individuals at each site best qualified to speak about the site's overall computing activities. For medium/large sites, the respondent was the CIO, an IT Director, or IT Manager. For small sites, it was an IT Manager or Owner. A predetermined number of interviews were completed in each establishment size and industry category to ensure an adequate sample reporting each country's establishment size and industry group with a 95% confidence interval. The strategy to collect data at the establishment level is explained by the will to ensure reliability in data collection.[3]

The survey covers a number of topics related to the adoption and impacts of the Internet and e-commerce.

Firm characteristics

- Industry sector, size of the establishment, and size of the company (number of physical locations, number of employees). This data was used to establish general categories and to allow for the weighting of actual measured frequencies and opinions in terms of the size of the firm.[4]
- The globalization of firms should be an important explanatory factor for their behaviors. This is estimated through several proxies. First, by the number of

[3] At the same time, this can be a bias, especially in the case of large companies. Depending on the centralization or decentralization of the e-commerce operations, the interviewed establishment can be a headquarters or a single establishment. What is reported is not easily comparable from one company to another since sometimes it refers to the online operation of the whole company, while sometimes it does not. Whether the (randomly) interviewed establishment is a production or a commercial site matters as well. This can bias interpretation and have an impact on international and inter-sector comparisons since the organization of the operations can differ among firms in function of their nationality and activity. The respondents could, in addition, have misinterpreted some questions. Indeed, with the total sample of 598 European establishments, 18- i.e. almost 1/4 of those who do not sell online- replied that they do not generate revenue from sales, while they report online sales. This suggests that some of the respondents forgot that they had to report for their site and not for the whole company. Since the proportion of establishments claiming that they are not selling online significantly differs among countries, this can induces biases. Moreover, misunderstandings could have occurred for respondents who apparently did not misinterpret the question. An interviewee, who declares that his establishment generates revenues from sales, can then reply to the question regarding e-commerce by reporting figures that correspond to the company as a whole. These potential biases should not inverse most of the results. However, they have to be taken into consideration when commenting on the comparisons.

[4] Such weighted measures can be difficult to interpret. Indeed, if an establishment operates a single central website, the weighted measure will multiply its data by the number of establishments in the company or by a ratio linked to its share of total employment can overweight the number of websites of the firm, or its IT expenditures, etc. To the opposite, if the interviewed establishment is not the one that operates the Internet-based operations, this company's propensity to use the Internet and e-commerce will be underestimated. These biases can be significant if one compares sub-population (e.g. sector or countries) with different structures in terms of size of the firms. Therefore, we decided not to use the systematically weighted measures.

- Weighted measures and means are used to produce descriptive statistics of France, that enable both the comparison of French firms among each other, given their size and their industry, and to compare France to the overall global sample.
- Unweighted measures and frequencies are used to produce comparative statistical analysis, and data analyses, and econometric testing applied to the European firms of the sample.

We considered it relevant to compare France to countries with similar levels of development and similar constraints in terms of demography, and economic and political environment. It would be stimulating, of course, to benchmark these European countries with the US and Japan in further studies.

establishments outside of the country, the number of employees worldwide, and the location of the headquarters (whether it is located outside of the country). Second, it is assessed though the globalization of markets and sourcing: revenue from sales of products/services, sales to business-government-education/consumers, sales from outside the country, and procurement spending outside the country. Third, it is assessed by a subjective judgment as to how much the business is affected by local, national or global competitors.

E-Commerce readiness

- Use of e-commerce technologies is assessed by the number of personal computers, the existence of websites accessible to the public, and the use of e-mail, intranet, extranet (accessible to suppliers or business partners, by consumers), EDI (whether it is standard or "Internet" EDI), EFT, or call centers.
- Uses of the Internet is qualified by the following types of business oriented applications: advertising and marketing, online sales, after sales customer service and support, online purchases, exchanges of operational data with suppliers, exchanges of operational data with business customers, and integration of business processes with suppliers/business partners. It is also asked whether the company is informed and participates in the Internet marketplace or the exchange of trading communities, and whether it plans to provide content/services for mobile customers.

Key barriers and incentives to e-commerce

The surveyed companies are asked their opinion on what they consider to be key drivers and inhibitors to the use of the Internet and e-commerce in their specific case. This was performed though a five point Likert scale measure:[5]

- Drivers are customer demands, the pressure of major competitors, the request of suppliers or government for public procurement, the incentives provided by the government, the need to reduce costs, to expand market for existing product/services, to enter new businesses or markets, or to improve coordination between customers and suppliers.
- Potential barriers are the need for face-to-face interaction, concerns about privacy of data or security issues, the fact that customers do not use the technology, the difficulty in finding staff with e-commerce expertise, the prevalence of credit card use in the country,[6] the costs of implementing an e-commerce site, the required organizational changes, the low ability to use the Internet as part of a business strategy, the cost of Internet access, the business laws that do not support e-

[5] As mentioned above, many of the measures are based on the 5 point Likert scale. Likert has two main advantages. First, they enable the interviewee to nuance its evaluation. Second, they allow computational means, eliminating extreme values. At the same time, these scales have strong boundaries. On the one hand, the relative value of the different quotations of the scale is strongly biased by the culture and the nationality of the respondent. Since they faced different average conditions, they can have a different perception of the relative importance of the same phenomena. This generates a well-known bias in international comparisons of personal opinions (about the strength of the foreign competitive pressure, for instance). Second, since the distribution of opinions are often asymmetric (abnormal distributions), the mean can be a bad indicator of the central value. The median and the mode can correct this bias, but they do not provide us with more significant information such as: What proportion of individuals are concerned (or not) by the measured item? Consequently, in addition to the analysis of means, we decided to build indicators based on the percentage of replies which value is superior to 3 (that correspond to the neutral value and is often a refuge for the respondent).

[6] The fact that this item is considered a potential barrier is in question. Indeed, credit cards can faciltate online payments and could therefore be considered drivers, rather than barriers.

commerce, the taxation of Internet sites, and the inadequate legal protection for Internet purchases.

Impact of online business

- The impact of online business is also measured by a subjective Likert-ranked assessment of the use of the Internet on various variables such as the efficiency of internal processes, the productivity of staff, the evolution of sales, the scope of sales, the quality of service to the customer, the internationalization of sales, the level of procurement costs, inventory costs, the quality of coordination with suppliers, the competitive position, the intensity of competition, or the number of distribution channels, suppliers, and competitors.

Diffusion of E-Commerce

The diffusion of e-commerce is measured both by the volume of sales and by the diversity and the nature of services provided online.

- Online sales are described by types of consumers and in terms of share of the total sales of the company. In addition, the survey assesses whether payments can be made online.
- Services provided online are described depending on the industries; Manufacturing (website support for product configuration, order tracking, service and technical support, product specification, account information); Distribution (website support for gift certificates and/or registry, product catalogue, product reviews, individual customization, account information); Finance (website support for online services such as filing applications, access to account information, online tools such as research tools); and also depending on who benefits from these services (businesses versus consumers, or both). The share of services conducted online is also measured.
- Online procurement is described in terms of percentage of goods ordered online for different categories of supplies.
- The enterprise strategy is also described to assess whether the company is going to integrate its web applications with its back-office capabilities, or integrate its databases with those of the suppliers.

IT Expenditures

Spending in IT is measured in percent of total revenue for calendar (or fiscal) year 2001. The share of the budget dedicated to web related applications is also measured, as well as the total number of IT professionals in the establishment.

Methodology for the Intra-European Comparison

While the three countries face similar external constraints and do not differ much in terms of development, it is essential to point out that some structural differences can impact the comparisons among them.

First, it has to be pointed out that the French questionnaires are significantly less complete than the German and the Danish ones. This could reflect a specific attitude of the French vis-à-vis this survey. Since the French seem less motivated by the development of e-commerce

than the Northern Europeans, the distribution of the missing values should not be the result of a random process. This could bias the result.[7]

Moreover, there are significant differences among the global sample. Almost one-fifth of French establishments do not generate any revenue from sales, while the figures for Denmark are 13% and 7.4% for Germany (Figure 1). This means that in the latter countries, less headquarters or pure manufacturing sites have been interviewed than in France. This can introduce bias in the trans-border comparisons.

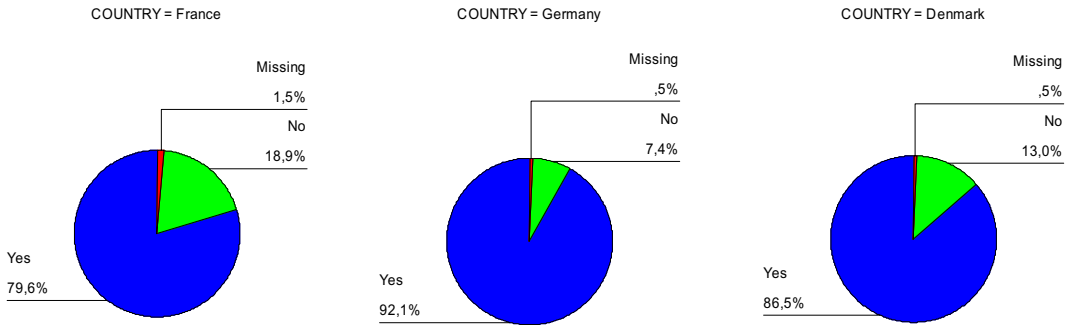
In the following pages, we will point out that Denmark often contrasts with France (and with Germany), and we will try to explain these differences, which can be partly due to other factors than to differences of behaviors and attitudes (see Appendix 1).

Table 2: Distribution of Establishments by Size-Sector and Country

	Country	Denmark	France	Germany	Total
Distribution of establishments by size and sector	Large manufacturing	34	34	35	103
	Large wholesale/retail distribution	34	33	32	99
	Large banking & insurance	32	33	33	98
	Small manufacturing	35	34	33	102
	Small wholesale/retail distribution	33	31	34	98
	Small banking & insurance	32	36	35	103
Total		200	201	202	603

Source. CRITO Global E-Commerce Survey 2002, own calculations, unweighted

Figure 1: Generate Revenue from Sales



Source. CRITO Global E-Commerce Survey 2002, own calculations, unweighted

E-COMMERCE READINESS

As stated in Brousseau (2001) and Brousseau & Kraemer (2002), France's information infrastructure is less developed than in countries with similar levels of development. This is true for both households and for professionals.

[7]To enable comparisons and to avoid biases due to the structure of the national industries, the global sample has the same structure in terms of firm size and industry (Table 2). However, we are not sure that the structure remains equivalent for each of the items since missing values are processed according to the "list wise" methodology that results in the removing of the observation when relevant data is missing. Since large Danish manufacturing firms significantly differ in terms of size and degree of globalization, this could impact the relevant explanation for observed international differences.

French households are significantly lower users of the Internet than other Europeans (Table 3). According to a recent survey, 50% of the French had never used the Internet in 2002, which is down from 70% in 2000. (Source: GfK/SVM Sciences et Vie micro, 2003). As pointed out in Table 4, households are continuing to be equipped with PCs; two-thirds of them being connected to the Internet. However, this effort is not sufficient to enable the French to catch up and they remain poorer users of PCs and of the Internet than the Europeans in general. While the majority of French are now users of mobile phones, the rate of use is lower than in other major European countries.

Table 3: The Digitization of the European Population in 2002

	Germany	Belgium	Spain	France	Italy	UK
Internet users (millions)	24.6	3.5	5.7	10.2	21	21.6
Share of the population with Internet access	30	44	29	29	38	43
Share of high-speed access to the Internet (on the total number Internet access)	21	25	25	23	21	14
Monthly time online per user	15h04	5h55	9h49	9h42	8h00	8h00
Share of the population with a mobile phone	65	70	75	62	89	75

Source: Le Journal du Net, 2003

Table 4: Key Figures on the Information Society in France[8]

	2001	2002
Internet Users (in millions)[1]	11.9	16.4
Households Equipped (in percent):		
• with PCs[2]	32.3%	35.7%
• with Internet Access [3]	21.3%	
• with high speed Internet access [4]	2.8%	6.4%
• with Play Stations [5]	19.8%	34%
• with Minitel [6]	13.0%	13.0 %
• with Home DVD Players[7]	11.8 %	14.2 %
• with subscription to Digital TV [8]	22.7 %	25.2 %
Number of Point of Public Access to the Internet	3 000	4 500
Online Sales (millions of euros) [9]	1 450	2 350

Sources:
1 : Médiamétrie (individuals above 10 who went online at least once in the last month)
2 : Médiamétrie, March 2002
3 : Baromètres Multimédia, Médiamétrie 2001 (on the basis of 6000 face-to-face interviews)
4 : Baromètres Multimédia, Médiamétrie 2001
5 : ISL/Médiamétrie, Etude 24000 Multimédia (surveys based on 24 000 interviews a year (2000 a month); interviews are above 18)
6 : France Télécom
7 : Baromètres Multimédia, Médiamétrie June 2002.
8: CSA
9: Jupiter MMXI, November 2001 (B to C)

[8] The 13% rate of diffusion of the Minitel seems to be quite low to explain both the success of the technology and how it hindered the diffusion of the Internet. In fact, the level of penetration was higher in the past. As pointed out in Brousseau [2001], half of the French population was able to access a Minitel in the beginning of the 1990's. Moreover, most of the businesses were equipped by that time. The use of Minitel has been decreasing since 1996 (as documented in Brousseau & Kraemer [2002]), and the devices that were manufactured in the late 1980's-beginning 1990's have been discarded or are becoming obsolete.

The same lateness in the adoption of the Internet applies for business users. In many respects, France lies behind. This is true both in general in our (weighted) global sample (Table 5) and in our (unweighted) European sample (Figure 2). There is a noticeable exception: standard EDI, which is used far more in France than anywhere in the world. Before going back to this, it is useful to comment on the rate of use of various technologies. The first comment that can be made when one compares the profile of adoption of the various technologies by the different industries in the three surveyed countries (Figure 2), is that cross-country contrasts are higher than cross industry contrasts. Put another way, the profile of adoption is quite similar across industries within the same country, while they are strongly contrasted from one country to another. While the specificities of industries can partly explain adoption, this is clearly a national factor, reflecting both the specific national dynamics and the impact of institutional frames that are the principal factors of ICTs adoption by business users.

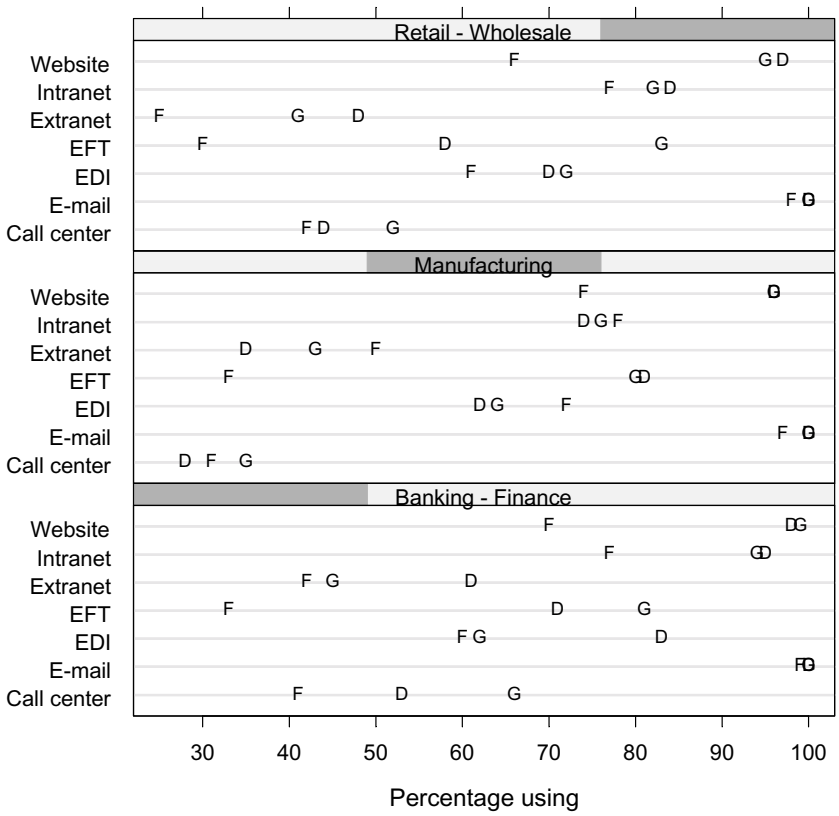
Table 5: Use of E-Commerce Technologies, 2002

	Establishment Size[a]		Sector[b]			Total	
Percent using …	SME	Large	Mfg.	Distrib.	Finance	France[c]	Global[d]
E-mail	97.6	100.0	92.2	99.5	97.1	97.7	98.5
Websites	53.8	80.0	60.1	52.1	58.0	54.5	74.1
Intranet	67.5	85.7	64.5	70.6	58.7	68.0	63.6
Extranet	14.1	53.0	31.1	8.1	27.8	15.2	32.7
• accessible by suppliers/ business partners[e]	11.1	30.6	20.5	7.9	17.0	11.6	20.9
• accessible by customers[e]	11.1	23.9	19.5	7.8	17.9	11.4	17.8
EDI	43.8	75.3	64.4	38.2	46.3	44.6	44.3
• over private networks only[e]	29.5	46.6	28.7	31.9	18.3	29.9	19.4
• Internet-based only[e]	4.6	4.4	15.1	0.0	13.1	4.6	8.4
• both[e]	7.9	22.7	19.8	3.9	13.2	8.3	15.9
EFT	30.1	38.5	23.8	32.8	26.5	30.3	43.4
Call center	21.7	47.9	21.9	23.1	18.5	22.4	32.3

Source: CRITO Global E-Commerce Survey, 2002

Notes: [a] SME (small and medium sized establishments) are those with 25-250 employees; large are those with more than 250 employees.
[b] Manufacturing includes all establishments classified as SIC 20-39; distribution includes wholesale and retail (SIC 50-54, 56-57, 59); finance includes banking and insurance (SIC 60-65).
[c] Responses were weighted based on the total number of establishments by employee size within the sector for each country. Survey sample sizes for France by sector are 68 establishments in manufacturing, 64 in wholesale & retail distribution, and 69 in banking & insurance; by size are 101 establishments classified as SME and 100 as large.
[d] Consists of weighted survey responses in 10 countries combined: United States, Mexico, Brazil, Germany, France, Denmark, Singapore, Taiwan, China and Japan. "Global" sample sizes by sector are 743 in manufacturing, 701 in wholesale/retail distribution, and 695 in banking & insurance; by size are 1,088 establishments classified as SME and 1,053 as large.
[e] Percent based on total sample.

Figure 2: Use of E-Commerce Technologies in Europe[9]



Source: CRITO Global E-Commerce Survey 2002, own calculations, unweighted
D = Denmark; F = France; G = Germany.

In any of the compared countries, three technologies rank first (and with the same hierarchy): e-mail, public website, and Intranet.[10] One can note that Intranet is more intensively used in France than public websites. This inversed hierarchy reflects the low likelihood of French firms, and in the case of firms that conduct business online, from developing websites. This can be directly correlated to the low rate of usage of the Internet in France. Since households and professionals do not use the Internet intensively, the incentives for firms to develop Internet-based interfaces are lower than in the other surveyed countries. This partly confirms our analysis in Brousseau & Kraemer (2002) and in Brousseau (2002), that France faces a trap that is characteristic of the early stage of diffusion of a network technology. Since there are too few users, there are little incentives to develop services, leading users to delay adoption.

One can point out that the same relationship between the low level of equipment of users and the low willingness of business to invest in e-commerce related technologies applies to mobile

[9] These Trellis figures are based on the work of Cleveland: W. S., (1993), *Visualizing Data,* Hobart Press, Summit NJ. The values for this figure and for the other figures of the same type are provided in Appendix 2. They have been generated thanks to the R open-source software (v.1.7.1.; http://www.r-project.org/). For more details see Ihaka R & Gentleman R., (1996), "R: A Language for Data Analysis and Graphics", *Journal of Computational and Graphical Statistics*, 5:3, 299-314.

[10] This later category can be considered surprising, especially when one contrasts it with Extranet. Indeed an advanced intranet, like an extranet, requires huge investments and much IT expertise. The survey did not ask whether firms were using an advanced Intranet or not. Therefore, respondents had a wide interpretation of what could be qualified as an Intranet in the companies in which internal lists of diffusions and access to central data-bases support coordination.

commerce. French citizens are less equipped with mobile phones than other Europeans and French firms are less likely to develop (or even intend to develop) m-commerce applications (Table 6).

Table 6: Content/Services to Mobile Customers, 2002

	Establishment Size[a]		Sector[b]			Total	
Percent providing or planning to provide mobile content or services[e]	SME	Large	Mfg.	Distrib.	Finance	France[c]	Global[d]
Already available	7.8	13.3	8.6	7.6	9.4	8.0	13.7
Plans to add within the next year	13.6	19.7	11.1	15.6	7.4	13.8	18.2

Source: CRITO Global E-Commerce Survey, 2002

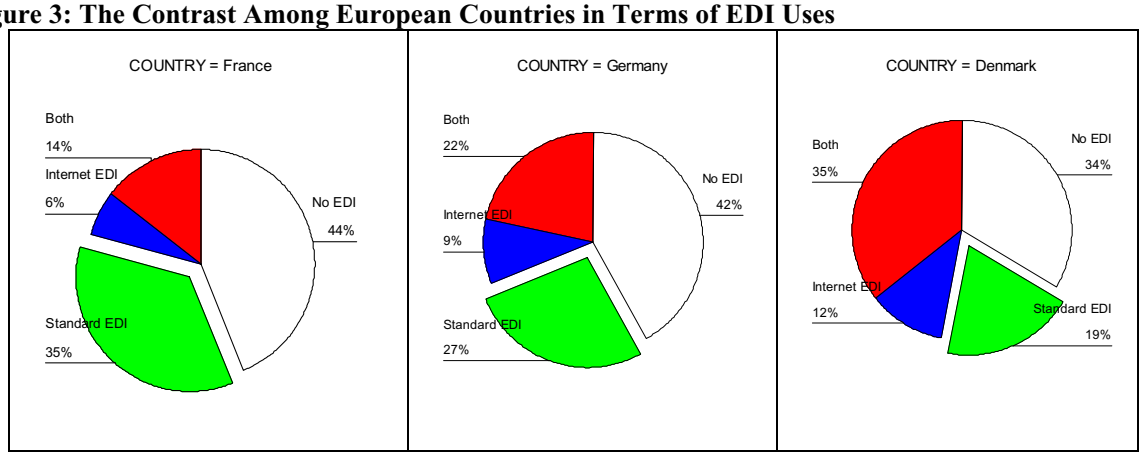
Notes: [a] SME (small and medium sized establishments) are those with 25-250 employees; large are those with more than 250 employees.
[b] Manufacturing includes all establishments classified as SIC 20-39; distribution includes wholesale and retail (SIC 50-54, 56-57, 59); finance includes banking and insurance (SIC 60-65).
[c] Responses were weighted based on the total number of establishments by employee size within the sector for each country. Survey sample sizes for France by sector are 68 establishments in manufacturing, 64 in wholesale & retail distribution, and 69 in banking & insurance; by size are 101 establishments classified as SME and 100 as large.
[d] Consists of weighted survey responses in 10 countries combined: United States, Mexico, Brazil, Germany, France, Denmark, Singapore, Taiwan, China and Japan. "Global" sample sizes by sector are 743 in manufacturing, 701 in wholesale/retail distribution, and 695 in banking & insurance; by size are 1,088 establishments classified as SME and 1,053 as large.
[e] Exact wording of question: Today it is possible to access content or services from various mobile devices such as mobile phones and handhelds such as Palms or Pocket PC devices. Does your organization provide or plan to provide content or services that mobile customers can access?

In the case of France, the delayed adoption is reinforced by the availability of alternative solutions. This can be seen in the case of EDI. As mentioned above, France seems to be a very specific user of EDI technologies. This is highlighted in Figure 3. Thirty-five percent of French businesses in the sample only use traditional EDI, while the figures for business users in Germany and Denmark are 27% and 19%, respectively. French firms' likelihood to use EDI in general is not that specific, however (as reminded in section 1), since France was an early adopter of standard EDI. Those firms that used either only standard EDI or both Internet and standard EDI have been experiencing EDI for years. As long as they remain satisfied by the services, they have low incentives to switch to the new technology. French firms did not switch to the new platform as the German and Danish firms did, probably because with fewer adopters of the Internet in France, positive returns of adoption was lower in France, compared to Germany and Denmark.

This is important to point out, since online sales are positively correlated to the adoption of the new generation of digital technologies.[11] We compared the relationship between the propensity to sell online and the use of various technologies. Our motivation in selecting the former variable is that selling online implies the use of the most advanced technologies. Table 7 shows a very significant, but negative relationship between the use of standard EDI and online sales; this relationship is positive for EDI and for all the other surveyed technologies. This suggests that what differentiated the studied establishments is not the use of digital technologies per se, but the type of technology used. Proprietary technologies tend to enable organized clubs of firms that are cooperating together, while standard open technologies are more likely to support market exchanges which require open platforms, since market relationships are more flexible. Moreover, the use of proprietary technology seems to be a barrier to the use of the newer, more open set of technologies.

[11] This has to be balanced by the fact that in our survey, online sales refers to sales over the Internet only. Since several alternative platforms, the Minitel for B2C, private networks for B2B, are available, France's online sales are underestimated and it is obvious that there is a positive correlation between the use of Internet technologies and Internet sales.

Figure 3: The Contrast Among European Countries in Terms of EDI Uses



Source: CRITO Global E-Commerce Survey 2002, own calculations, unweighted

Table 7: The Relationship between Online Sales and the Use of Various Technologies

		Online sales		*Chi-Square*	*Cramer's Phi*
		No	Yes		
Website accessible by public	No	66	8	33,280 (,000)	,235 (,000)
	Yes	285	244		
Use an intranet	No	89	21	28,500 (,000)	,217 (,000)
	Yes	262	231		
Use an extranet	No	225	114	21,515 (,000)	,190 (,000)
	Yes	123	136		
Use EDI	No	127	64	7,182 (,007)	,111 (,007)
	Yes	215	177		
Standard EDI only	No	237	202	11,831 (,001)	**-,140** (,001)
	Yes	114	50		
Use a call center	No	235	104	38,713 (,000)	,254 (,000)
	Yes	115	146		
Use EFT	No	139	77	5,810 (0,016)	,101 (0,016)
	Yes	192	240		

Source: CRITO Global E-Commerce Survey 2002, own calculations, unweighted

Increasing the return of adoption and specific paths of diffusion explain to a large extent, the French specific profile. At the same time, this survey points out that French firms tend to use digital network technologies to fuel their existing business processes; especially their internal processes, by enhancing the integration among their applications and the coordination processes with close business partners, rather than increasing their sales by developing new marketing channels. This specific behavior, as compared to Danish and German firms, also explains why intranet technologies and EDI are more intensively used in France than in the other European countries.

Transnational comparisons can also be made and completed by inter-industry comparisons (Table 8 and Figure 4). As compared to their European competitors, French firms are less intensive users for most of the IT covered in the survey.

However, there is one type of technology which has a wider gap than the average: Electronic Fund Transfer. This is directly linked to the poor performance of the French finance and

banking industry as compared to their foreign competitors. More precisely, this can be related to two main causes. First, there is an "early adopter" effect that induces path dependency (see Brousseau (2003)). In the 1970's French banks developed a quite efficient computer based system to manage clearing among them. Indeed, French regulations limit the bank's ability to charge for the management of payments (especially checks). This pushed French banks to develop an efficient system to handle these payments. Today, the cost of payments by check is the lowest in Europe. However, the system was not really featured to support the management of individual wire. When EDI developed in the 1980's, the management of payment was already a difficult task since it was almost impossible to reconcile the exchanges among business partners and the payments among their banks, because the French bank, protected from foreign competition, did not respond to the demand of their business users to develop a system that would have been able to support the management of single payments. This hindered the development of EFT. Second, the data clearly shows that French banks are using IT less intensively than their foreign competitors. Among the three surveyed industries, banks manage the services that are the most likely to be digitized. In Germany or Denmark, banks seem to be the most intensive users of all the categories of IT covered by the study. This is not the case in France. French banks are the poorest users of all IT, compared to retail and manufacturing firms. Due to the fact that the survey focuses on Internet related technologies (except for EDI and EFT), the data probably overemphasizes the French's poorer performance in regard to the use of IT (since in addition to the inter-bank computer based clearing system, most French banks have been operating for years with company-wide integrated information systems that support their back and front office operations). However, it is clear that there is a gap between French banks and their competitors.

French manufacturing industries seem to be the most likely to use IT in France.[12] Except for websites and EFT, French manufacturing is not different from the Danish and the German ones. This seems to confirm that the French's low propensity for using digital technologies is not general, but concentrated in some industries. The under-digitization of the French finance industry, as well as within French households, leads to a lower level of digitization that hinders a higher level of digitization of several industries and segments of the population. Manufacturing, since it uses IT to support intra-firm or inter-firm coordination, is one of these "digital islands." To a lesser extent, this is also the case for the retail industry that performs near the European average, except for website (few online consumers), extranet (because EDI is widely used in the industry), and EFT (see above).

This analysis of the technologies is confirmed by the analysis of uses (Table 8 and Figure 4). Generally speaking, the most frequent use of the Internet is online advertising (while it is significantly lower in France[13]). The bank and finance industry is the most likely to perform online sales. This is probably related to the specificity of the provided services that can be fully digitized. However, this is true only in Denmark and Germany.

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[12] Table 8 shows that the B&F industry is the French leader for using the Internet to perform many operations. However, this is a "natural" trend in any economy since the B&F industry is, by definition, an information industry that naturally goes digital. What is significant is the fact that the French B&F industry is notably less digitized than the German or the Danish industries, while the gap is not so huge between the French manufacturing industry and its foreign counterparts (see Figure 6).

[13] In France, depending on the industry, between 37% and 51% of firms use online technologies to advertise their products or services, while these figures reach 70% to 90% in Denmark and Germany, respectively. This is surprising since online advertising is very cheap and a good complement to traditional media. However, this is consistent with the low level of diffusion of the Internet.

In general, online sales in France are weak. However, France is characterized by a high rate of Internet use to support interfirm coordination. This propensity is even higher in European manufacturing industries. In this industry, interfirm coordination is the most frequently used, before advertising. This confirms the specific profile of France, since in Germany and in Denmark, retail and wholesale companies seem to use the Internet as intensively as manufacturing firms do to support coordination with their partners. In France, distribution companies do not use the Internet intensively, as do manufacturing firms. The more intense use is for supporting coordination among suppliers.

It is interesting to note that the French Internet applications are more integrated to internal information systems than the global sample, and that it is due to the very high rate of integration in manufacturing (37.3%), and to a less extent in the distribution (30.7%) industry (Table 9). It can be contrasted with the low level of integration of these applications with suppliers' or business customers' information systems (except for manufacturing, where France is far above the global mean; Table 9). With the information about the technologies used to coordinate with business partners and the way they are used (respectively Table 8 and Figure 4 and Table 9 and Figure 5), these figures indicate that, except for financial applications, and especially in the manufacturing industries, French firms' apparent lateness is due to the use of alternative technologies and to the fact that they seem to integrate their Internet application with their information systems more deeply. Compared to what happened in many countries, the French did not primarily develop digital show-windows before seeking to integrate them with their business operations to coordinate with their business partners. From the beginning, they considered Internet applications as part of their information system. More integrated Internet interfaces are longer to develop, and less easy to interconnect with business partners' IS.

In addition to the digital divide between manufacturing industries and services, another divide has to be pointed out: the expected divide between SMEs and large companies. Since the average manufacturing company is larger than the average service company, this can partly explain the difference in the intersectoral rate of use.

In summary, France is characterized by a low propensity to use the Internet in B2C, while France ranks high in the use of the Internet in B2B to support interfirm coordination, especially in the manufacturing industries. There are two contrasted profiles of adoption in Europe. On the one hand, France's path of adoption is linked to the slow migration of the former technological base, especially traditional EDI, to the new Internet standards, with the use of XML-EDI. This slowness has two causes. First, it is due to the costs of changing the installed base and to the low diffusion of the Internet in France. Second, it is due to the fact that the French tend to develop more integrated systems. Both factors delay adoption. This explains why digital islands, separated from each other, characterize France. On the other hand, the Internet is more widely and more uniformly used in Denmark (and to a lesser extent in Germany). Due to the homogeneity of the country and of the industry, the rate of online supplying is far above France. About 70% to 80% of the Danish respondents buy online (versus 30% for France) and this is uniform across industries.

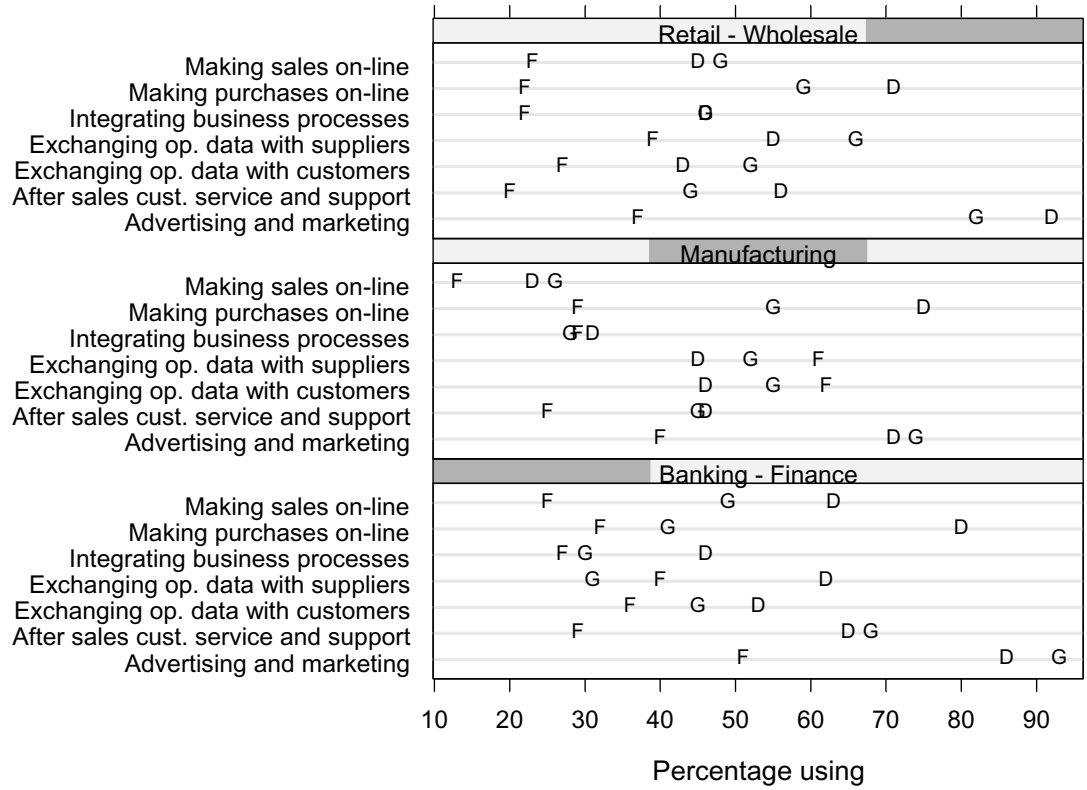
Table 8: Uses of the Internet, 2002

	Establishment Size[a]		Sector[b]			Total	
Percent using the Internet for …[e]	SME	Large	Mfg.	Distrib.	Finance	France[c]	Global[d]
Advertising and marketing purposes	25.8	48.2	28.4	23.0	45.7	26.4	57.6
Making sales online	11.8	23.2	12.8	11.1	17.0	12.1	29.9
After sales customer service and support	16.0	28.9	15.9	14.6	28.4	16.3	43.7
Making purchases online	23.9	34.1	18.6	25.4	27.4	24.1	29.7
Exchanging operational data with suppliers	35.0	62.0	50.3	29.7	43.8	35.7	48.1
Exchanging operational data with business customers	39.5	50.2	61.5	32.6	39.8	39.7	50.7
Formally integrating the same business processes with suppliers or other business partners	23.9	27.4	31.5	19.6	35.4	24.0	33.9

Source: CRITO Global E-Commerce Survey, 2002

Notes: [a] SME (small and medium sized establishments) are those with 25-250 employees; large are those with more than 250 employees.
[b] Manufacturing includes all establishments classified as SIC 20-39; distribution includes wholesale and retail (SIC 50-54, 56-57, 59); finance includes banking and insurance (SIC 60-65).
[c] Responses were weighted based on the total number of establishments by employee size within the sector for each country. Survey sample sizes for France by sector are 68 establishments in manufacturing, 64 in wholesale & retail distribution, and 69 in banking & insurance; by size are 101 establishments classified as SME and 100 as large.
[d] Consists of weighted survey responses in 10 countries combined: United States, Mexico, Brazil, Germany, France, Denmark, Singapore, Taiwan, China and Japan. "Global" sample sizes by sector are 743 in manufacturing, 701 in wholesale/retail distribution, and 695 in banking & insurance; by size are 1,088 establishments classified as SME and 1,053 as large.
[e] Exact wording of question: "Does your establishment use the Internet for …"

Figure 4: E-Business over the Internet in Europe



Source: CRITO Global E-Commerce Survey 2002, own calculations, unweighted
D = Denmark; F = France; G = Germany.

Table 9: Enterprise Integration Strategy, 2002

	Establishment Size[a]		Sector[b]			Total	
Extent to which Internet applications are electronically integrated with …	SME	Large	Mfg.	Distrib.	Finance	France[c]	Global[d]
Internal databases and information systems[e]							
Percentage of little to none	49.7	41.4	53.0	46.6	56.6	49.3	52.5
Percentage of some	18.3	33.2	9.7	22.7	18.1	18.9	23.6
Percentage of a great deal	32.1	25.4	37.3	30.7	25.3	31.8	23.9
Those of suppliers and business customers[f]							
Percentage of little to none	80.9	78.2	71.3	83.9	86.4	80.8	72.1
Percentage of some	14.1	14.3	13.6	14.9	10.7	14.1	18.3
Percentage of a great deal	5.0	7.5	15.1	1.1	2.9	5.1	9.6

Source: CRITO Global E-Commerce Survey, 2002

Notes: [a] SME (small and medium sized establishments) are those with 25-250 employees; large are those with more than 250 employees.

[b] Manufacturing includes all establishments classified as SIC 20-39; distribution includes wholesale and retail (SIC 50-54, 56-57, 59); finance includes banking and insurance (SIC 60-65).

[c] Responses were weighted based on the total number of establishments by employee size within the sector for each country. Survey sample sizes for France by sector are 68 establishments in manufacturing, 64 in wholesale & retail distribution, and 69 in banking & insurance; by size are 101 establishments classified as SME and 100 as large.

[d] Consists of weighted survey responses in 10 countries combined: United States, Mexico, Brazil, Germany, France, Denmark, Singapore, Taiwan, China and Japan. "Global" sample sizes by sector are 743 in manufacturing, 701 in wholesale/retail distribution, and 695 in banking & insurance; by size are 1,088 establishments classified as SME and 1,053 as large.

[e] Exact wording of question: "Using a 5-point scale where 5 is "a great deal" and 1 is "not at all", please rate the extent to which your Internet applications are electronically integrated with your internal database and information systems. Scores of 1 or 2 are categorized as "little to none", a score of 3 as "some" and scores of 4 or 5 as "a great deal."

[f] Exact wording of question: "Using a 5-point scale where 5 is "a great deal" and 1 is "not at all", please rate the extent to which your company's databases and information systems are electronically integrated with those of your suppliers and business customers. Scores of 1 or 2 are categorized as "little to none", a score of 3 as "some" and scores of 4 or 5 as "a great deal."

KEY BARRIERS AND INCENTIVES

Drivers

The specific profile of France is confirmed when analyzing motivations for the use of the Internet to perform business operations. French firm motivations are significantly lower than the average (Table 10). There are two exceptions:

- France reaches the average when improving coordination with customers and suppliers is in question. Since French figures are significantly lower, most of the time 50% behind the worldwide mean, this confirms the idea that French firms tend to implement systems aimed at automating inter-firm coordination, and that are therefore more complex to implement since they have to link information systems of both partners.[14] One can point out as well that this likelihood is the highest in the manufacturing industries.
- France is above the average when it comes to governmental incentives for using the Internet. This also confirms the remaining major influence of the French government in the industry, and its essential role in the digitization of the society (even if governmental drivers are the weakest drivers in France).

These are also confirmed by the European data (Figure 5):

[14] It has to be pointed out that this motivation ranks as the highest in most countries and industries- see Figure 5. One can therefore wonder if the interviewee did not have a very broad understanding of it. Indeed, enhanced coordination can begin with e-mail and end with the interoperability of information systems.

Table 10: Drivers for Internet Use, 2002

	Establishment Size[a]		Sector[b]			Total	
Percentage of individuals indicating driver as a significant factor …[e]	SME	Large	Mfg.	Distrib.	Finance	France[c]	Global[d]
Customers demanded it	14.3	25.3	15.1	14.5	13.8	14.6	36.9
Major competitors were online	22.0	23.3	23.9	19.9	31.8	22.0	31.3
Suppliers required it	9.5	13.0	5.4	10.9	10.0	9.6	22.3
To reduce costs	18.2	22.3	16.0	18.7	21.1	18.3	35.7
To expand market for existing product or services	21.3	30.0	23.5	18.9	34.3	21.5	47.9
To enter new businesses or markets	20.2	21.9	21.6	19.3	23.2	20.2	42.0
To improve coordination with customers and suppliers	41.6	36.2	37.2	44.0	33.0	41.4	43.7
Required for government procurement	14.6	19.8	10.2	14.6	26.8	14.8	15.2
Government provided incentives	9.3	1.7	1.7	11.7	7.2	9.1	8.3

Source: CRITO Global E-Commerce Survey, 2002

Notes: [a] SME (small and medium sized establishments) are those with 25-250 employees; large are those with more than 250 employees.

[b] Manufacturing includes all establishments classified as SIC 20-39; distribution includes wholesale and retail (SIC 50-54, 56-57, 59); finance includes banking and insurance (SIC 60-65).

[c] Responses were weighted based on the total number of establishments by employee size within the sector for each country. Survey sample sizes for France by sector are 68 establishments in manufacturing, 64 in wholesale & retail distribution, and 69 in banking & insurance; by size are 101 establishments classified as SME and 100 as large.

[d] Consists of weighted survey responses in 10 countries combined: United States, Mexico, Brazil, Germany, France, Denmark, Singapore, Taiwan, China and Japan. "Global" sample sizes by sector are 743 in manufacturing, 701 in wholesale/retail distribution, and 695 in banking & insurance; by size are 1,088 establishments classified as SME and 1,053 as large.

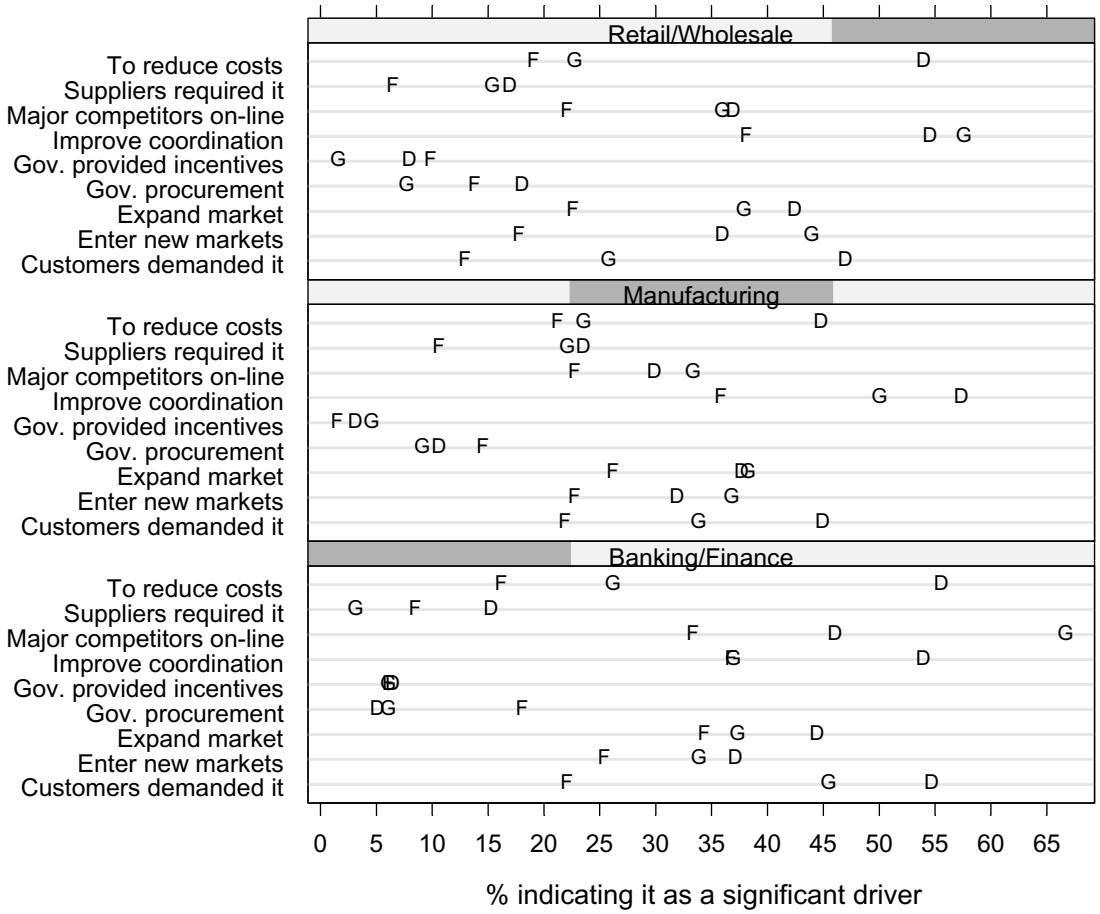
[e] Exact wording of question: "Using a 5-point scale where 5 is "a very significant factor" and 1 is "not a factor at all," please rate how significant each of the following was to your organization's decision to begin using the Internet for business. A score of 4 or 5 was classified as "a significant factor."

At the European level, when one looks at the data in more detail (Figure 5), two types of contrasted sets of motivations can be identified. On the one hand, firms can be proactive in their use of e-business in general. They seek to extend their market and develop their activity by using the Internet. On the other hand, firms can be adaptive only. They adopt the Internet and related business practices because their environment encourages them to do so. It is not surprising to see that French firms are more adaptive than their European competitors, and they are less likely to implement e-business methods, since the customers are not pushing for it. The contrast is especially strong with Denmark. In various Danish industries, the pressure from consumers is homogeneous and strong. In France, there is significant pressure by suppliers in the manufacturing industries only. In line with what was written earlier, one can also point out that the French B&F companies are clearly less subjected to competitive pressures to go online (33%) than the Germans (67%) or the Danish (46%).

Figure 5 confirms that cross-country contrasts are wider than cross-industry ones. Principal component analysis, however, shows that behind the various national or sectoral means, there are different types of firms characterized by contrasted motivations. Three groups of motivations can be identified:

- Proactive motivations; when users see the Internet as a means of developing their activity.
- Followers' motivations; when users adopt the Internet to react to external competitive pressures.
- Governmental drivers; when companies adopt the Internet because the government provides incentives or requests the use of digital technologies to trade with them.

Figure 5: The Motivations to Perform Business Online in Europe



Source: CRITO Global E-Commerce Survey 2002, own calculations, unweighted
D = Denmark; F = France; G = Germany.

Table 11 shows that the index of proactivity is the one that contrasts adoption behaviors the most. It explains 32% of the total variance. It is also the only one that can be considered as robust, according to Cronbach's alpha.[15]

[15] Cronbach's alpha measures how well a set of items (or variables) measures a single unidimensional latent construct. It can be considered robust (in the sense that the construct measures one dimensionally only), when it is superior to 0.7. However, since this statistic is dependent on the number of items, one considered that the minimal number of items should be above 3. Since our "measure" of governmental incentives relies on two variables only, our Cronbach's alpha is particularly weak. Moreover, our first construct is clearly a scale factor (Jolliffe, (2002)) that reveals a posivite correlation among all the active items taken into account in the PCA. In the case of this study, the scale factor clearly measures the interest of the business users for the Internet in general, and e-business in particular. Surveyed firms are therefore contrasted by this (proactive) interest, more than by the specificities of their competitive or governmental environment.

Table 11: Rotated Component Matrix of the Internet Drivers in Europe

		Component			Cronbach's alpha
		1	2	3	
Proactive Drivers 32 % of the total variance	Enter new businesses or markets	**.848**			.7289
	Expand market for existing prod	**.837**			
	Improve coordination	.560			
	To reduce costs	.539			
Adaptive Drivers 15 % of the total variance	Customers demanded it		**.804**		.6070
	Major competitors online		**.743**		
	Suppliers required it		.587		
Government Drivers 12% of the total variance	Government provided incentives			**.801**	.4813
	Required for government procurement			**.757**	

Source: CRITO Global E-Commerce Survey 2002, own calculations, unweighted Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. Only absolute values superior to 0,4 59% of the total variance in explained by the three factors

To contrast various groups of firms featured by their adoption behavior, we performed a cluster analysis. We used the k-means method.[16] This is the recommended methodology for samples with more than 100 individuals (Lebart, Morineau, Piron, 2002). Moreover, this method provided us with more homogeneous clusters and a better distribution of individuals among them. This allows us to describe the various groups with a better level of confidence. We applied the k-means method to the individuals identified in the factorial space of dimension 3 resulting from the Principal Component Analysis (instead of using the 9 dimensions space resulting from the use of all the active variables). This procedure eliminates most of the random fluctuations that generally account for most of the variance of the less discriminatory items (Lebart, Morineau, Piron, 2002). This results in more consistent clusters.

We identified four contrasted groups (Figure 6):

- Establishments in C 1 can be labeled "**inert.**" These 133 establishments do not seem to be pushed by any of the 9 drivers to use the Internet.[17]
- C 2 corresponds to the 166 establishments that are "**adaptive**" in the sense that the adoption of the Internet and related business methods is constrained (or stimulated) by clients and competitors.
- C 3 groups the 146 "**proactive**" establishments that adopt the Internet because they identify opportunities to increase sales or exploit new market opportunities by doing so.
- C 4 is composed of establishments that use the Internet because they are "**influenced by the Government**."

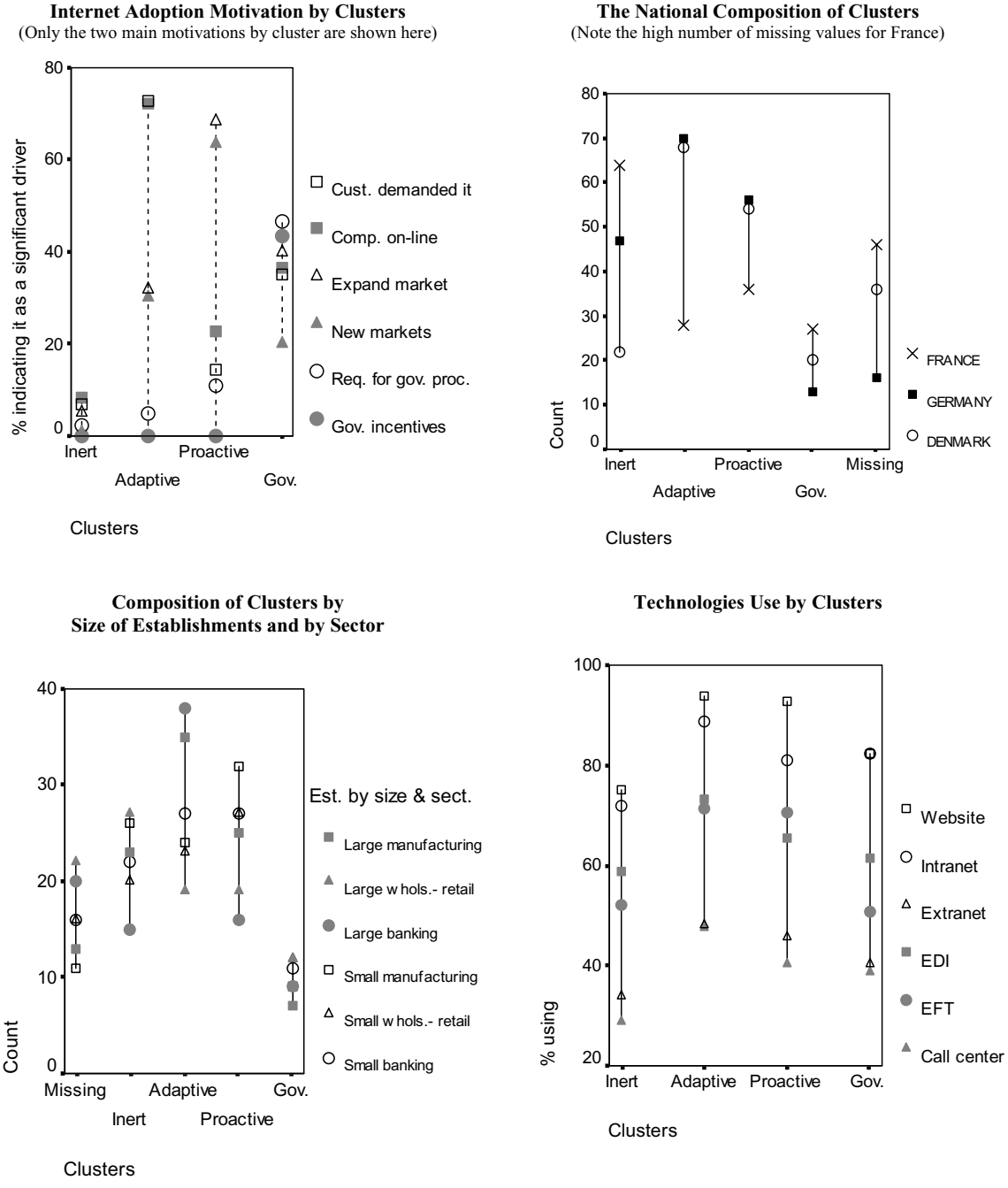
Inert companies are usually large firms (in particular, from the manufacturing and distribution industries and, small manufacturing firms). However, large manufacturing firms and large banks are overrepresented in the adaptive group, while small firms are more frequent in the proactive group. This suggests some inertia of large firms as compared to small ones. Both can be explained: Large firms generally already operate sophisticated information systems. Implementing Internet applications is more complex since they have to make them interoperable with their existing applications (that often already provide them with the same

[16] We used the k-means procedure of SPSS v.11. In this study we systematically compared the results we got with the k-means methodology with those we got from the Ascending Hierachical Clustering based on the Ward criterion (also available on SPSS v.11).

[17] Let us remind the reader that in this comparative analysis we only took into account the establishment that ranked the various items above 3 on the 5 grade Likert scale.

functionalities). Above all, switching to new business processes requires organizational changes (Brousseau & Rallet, 1998). Such changes are more complex and more costly in large firms.

Figure 6: A Cluster Analysis of the Motivation to Adopt E-business in Europe



Source: CRITO Global E-Commerce Survey 2002, own calculations, unweighted

Adaptive firms can also be contrasted with proactive ones when one examines the technology they use. They do not differ significantly, except for call centers and EDI. Pro-active firms are more likely to use call centers, suggesting that they are seeking to sell online. Adaptive firms are more intense users of EDI. First, this suggests that they are not less intensive users of IT, but that they use more traditional technologies than the proactive ones. This confirms the idea that they have to bear technological switching costs when they want to adopt Internet-based technologies. Second, this confirms that they are more interested in digitizing inter-firm coordination than by buying or selling online. In their case, e-business does not mean e-commerce, but rather the rationalization of their operations.

Firms influenced by the government do not show a specific profile. This suggests that the government influences those firms that are working with them. Due to the intensity of the intervention from the French government in the industry, France ranks first in this cluster.

The comparison between France, Germany, and Denmark is not surprising. French firms are far less likely than German and Danish firms to be adaptive and proactive, and are over-represented in the inert category. It is also interesting to note that there are surprisingly more pro-active firms in the French sample than adaptive firms (while the ranking is the inverse both in Germany and Denmark). This confirms two expected results. First, French indicators of the digitization of the economy and the society are not lower because French users are less intensive users of digital technologies, but because there are less users in France. Second, there are fewer users in France, because there are fewer incentives to adopt the new technological base since the low rate of adoption generates low positive network externalities for new users, who therefore delay adoption.

Barriers

Compared to the global sample, French companies do not identify the same barriers to e-commerce as their global competitors (Table 12). Surprisingly, the main difference does not lie in the low propensity of consumers to use the Internet.[18] French companies point out an essential element: the need for face-to-face interactions and the inadequate protection for Internet purchases. There is a sensitive difference between these two factors that rank first for French firms, while they do not seem so important in other countries. The French sensitivity to inadequate protection for Internet purchases is essentially due to the opinion of SMEs (especially in the distribution and finance industries). This might be due to a cognitive bias, since the legal framework does not seem to generate the same problems for large users. This may also be true because large firms are able to implement technological and organizational solutions that enable them to secure their transactions. Last but not least, this can also be due to the fact that large firms consider the Internet as a support for B2B coordination applications, rather than as a means for selling online to final consumers, while small firms

[18] A possible explanation of this might be that the low propensity of consumers to use the web matters only for B2C applications, while the survey points out that French firms focus on B2B applications. Moreover, in France, since many online B2C merchants are targeting a certain "niche" (the wealthiest, young professionals), the low diffusion of the Internet might be considered a second-rank barrier. Put another way, the explanation can lie in the specific path of development of e-commerce in France.
However, there is a different (and complementary) line of explanation. The low propensity of customers to use the web really matters when a business seeking to develop B2C has decided to actually go online. If, for various reasons, firms consider that there are essential barriers that prevent them from selling online, then they will not consider the low rate of adoption of the Internet as an essential barrier. Since France is characterized by a high rate of firms with a low level of maturity in terms of e-commerce (See Figure 11 and the comments associated to Table 13), this might explain why the respondents do not consider this factor an essential barrier.

consider the Internet primarily as a support for B2C commerce. On the contrary, the need for face-to-face interaction is recognized as the essential barrier to e-commerce for all kinds of companies in France. In this sense, the French are quite different than their foreign counterparts. It is interesting to note that this specific item is also identified as an essential barrier of e-commerce in Denmark, where e-commerce is much more developed. This French specificity is also confirmed by the fact that French companies do not consider costs, security, and shortage of skills as essential barriers to the development of the Internet-based commerce, while this is the case for the global sample.

Table 12: Barriers/Difficulties, 2002

	Establishment Size[a]		Sector[b]			Total	
Percentage indicating statement is a significant obstacle[e]	SME	Large	Mfg.	Distrib.	Finance	France[c]	Global[d]
Need for face-to-face customer interaction	46.6	43.1	36.1	51.1	37.5	46.5	33.8
Concern about privacy of data or security issues	19.3	47.3	23.5	15.2	45.2	20.0	44.2
Customers do not use the technology	30.8	18.7	27.2	33.7	16.6	30.5	31.4
Finding staff with e-Commerce expertise	20.5	10.9	5.5	23.9	26.7	20.3	26.5
Prevalence of credit card use in the country	13.5	19.4	19.2	11.8	14.1	13.6	20.3
Costs of implementing an e-Commerce site	21.6	26.3	20.1	23.6	11.9	21.8	33.6
Making needed organizational changes	22.1	24.7	19.3	23.6	19.1	22.2	23.9
Level of ability to use the Internet as part of business strategy	16.1	17.3	18.1	16.2	11.2	16.2	24.8
Cost of Internet access	5.5	13.2	11.1	3.8	6.4	5.7	15.1
Business laws do not support e-Commerce	23.9	29.5	20.5	23.6	35.0	24.1	24.2
Taxation of Internet sales	20.1	11.6	13.0	23.5	15.5	19.9	16.5
Inadequate legal protection for Internet purchases	39.0	27.9	15.9	47.1	35.1	38.7	34.1

Source: CRITO Global E-Commerce Survey, 2002

Notes: [a] SME (small and medium sized establishments) are those with 25-250 employees; large are those with more than 250 employees.
[b] Manufacturing includes all establishments classified as SIC 20-39; distribution includes wholesale and retail (SIC 50-54, 56-57, 59); finance includes banking and insurance (SIC 60-65).
[c] Responses were weighted based on the total number of establishments by employee size within the sector for each country. Survey sample sizes for France by sector are 68 establishments in manufacturing, 64 in wholesale & retail distribution, and 69 in banking & insurance; by size are 101 establishments classified as SME and 100 as large.
[d] Consists of weighted survey responses in 10 countries combined: United States, Mexico, Brazil, Germany, France, Denmark, Singapore, Taiwan, China and Japan. "Global" sample sizes by sector are 743 in manufacturing, 701 in wholesale/retail distribution, and 695 in banking & insurance; by size are 1,088 establishments classified as SME and 1,053 as large.
[e] Exact wording of question: "Using a 5-point scale where 5 is "a very significant obstacle" and 1 is "not an obstacle," please rate how significant the following obstacles are to your establishment's ability to do business online. A score of 4 or 5 was classified as "a significant obstacle."

At the European level (Figure 7), contrasted (and expected) profiles among industries can be identified:

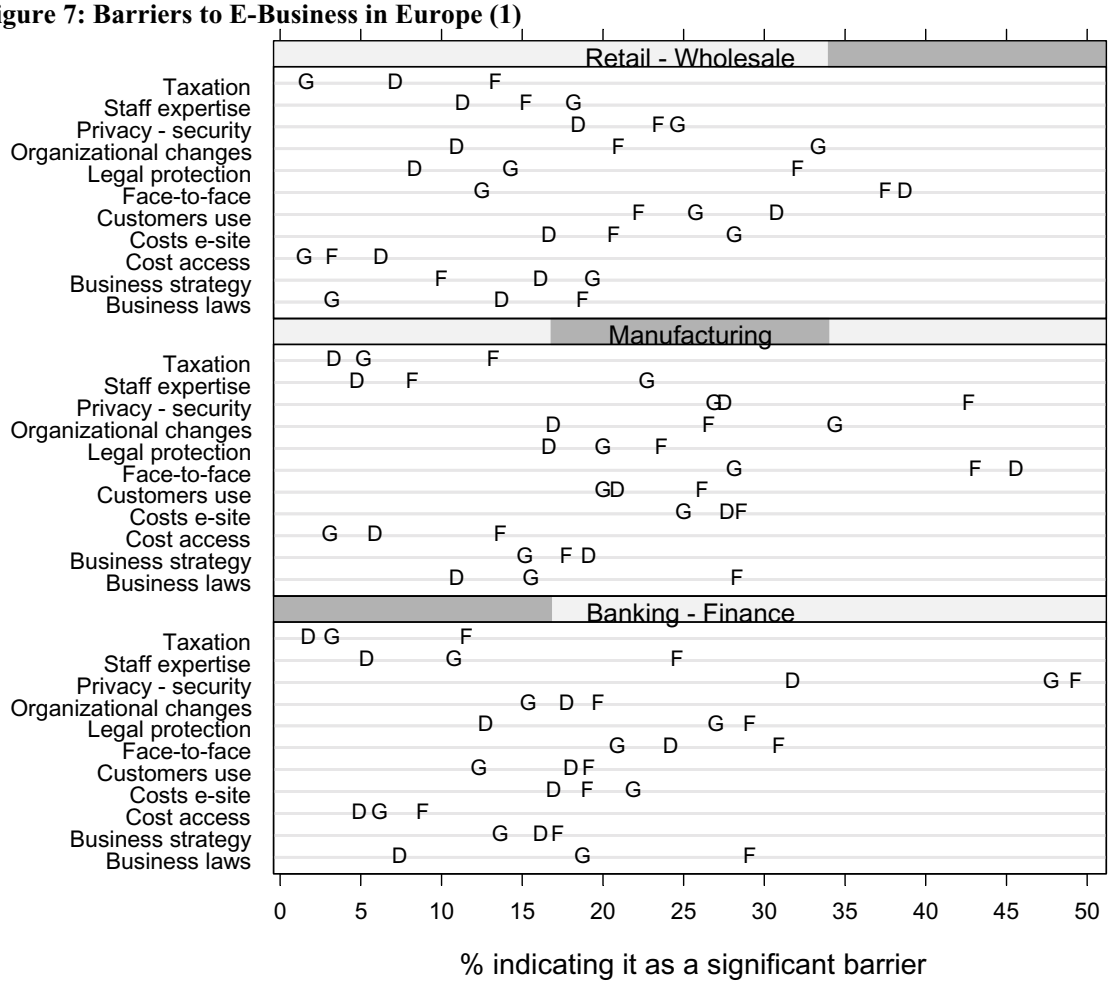
- Essentially, security concerns banks and manufacturing companies to a lesser extent. This is true in any of our three surveyed countries.
- Face-to-face meetings seem essential in the manufacturing industries, and to a lesser extent in the distribution sector.

It is important to point out that security ranks first with the French manufacturing industries, while it seems to be a less sensitive issue in other European manufacturing industries. Intersectoral differences among the sensitivity to other barriers are weak. One can, however, point out that manufacturing is particularly sensitive to reorganization costs, while the distribution firms express concerns over the low propensity of consumers using the Internet.

One can also point out that in Europe, costs and institutional barriers (legal framework, taxes; Figure 8) are not considered essential barriers, compared to technical and behavioral ones

(security, need for face-to-face interactions). Again, there is a strong contrast between France and Denmark. Danish firms seem particularly free of any institutional barriers, while French firms still consider them important.

Figure 7: Barriers to E-Business in Europe (1)



Source: CRITO Global E-Commerce Survey 2002, own calculations, unweighted
D = Denmark; F = France; G = Germany.

We performed a Principal Component Analysis to go further into the analysis of the barriers to e-commerce and the contrasted behaviors of firms.[19] Three main discriminatory dimensions can be identified (Table 13). Institutional Barriers (law, taxes and costs of access; the latter being related to the regulatory environment in the telecommunication industry), while not being essential barriers (Figure 8), are the most discriminating barriers among firms.[20] This suggests that firms react differently to common constraints. Internal costs (website implementation, organizational change) differentiate among firms as well. Concerns about the compatibility of online sales with the business model (need for face-to-face interactions, ability to implement the Internet in the strategy, rate of use of the Internet by consumers) are the third axis of discrimination.

[19] We excluded the item "Prevalence of Credit Card Use" from the analysis since it is not clear whether this is a barrier or a facilitator for e-commerce. We checked that our analysis is not biased by the exclusion of this item.
[20] It is interesting to point out that the "Security/Privacy" item that is an essential barrier to e-commerce, does not discriminate against firms, and therefore, is not grasped by the Principal Component Analysis.

Table 13: Rotated Component Matrix of the Internet Barriers in Europe

		Component			Cronbach's alpha
		1	2	3	
Institutional Barriers 33.5 % of the total variance	Taxation of Internet sites	**.765**			**.76**
	Business laws do not support e-commerce	**.750**			
	Inadequate legal protection for Internet purchases	**.746**			
	Cost of Internet access	**.673**			
Internal adaptation costs 14.2 % of the total variance	Costs of implementing an e-commerce site		**.819**		**.67**
	Making needed organizational changes		**.809**		
Compatibility with the e-commerce 11.4 % of the total variance	Need for face-to-face interaction			**.783**	**.43**
	Level of ability to use Internet as part of business strategy		**.452**	**.594**	
	Customers do not use this technology			**.562**	

Source: CRITO Global E-Commerce Survey 2002, own calculations, unweighted Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization. Only absolute values superior to 0,4 59% of the total variance is explained.

Due to the fact that the essential axis of discrimination among firms is based on the less sensitive set of barriers, the interpretation of the principal component analysis has to be combined with the analysis of the clustering performed on the basis of this PCA. Four contrasted clusters of firms can be identified (Figure 8).

- C1 groups the establishments that are mainly concerned by adaptation costs.
- C2 groups the establishments for which the primary concerns are institutional barriers.
- C3 are establishment groups that do not feel they are affected by important barriers.
- C4 is composed of firms that raise the issue of the compatibility of their activity with selling online.

These four clusters could be associated with various levels of maturity in the use of e-commerce. Institutional barriers are often a concern before really adopting e-commerce practices (see Figure 8). The potential adopters often overestimate them, since those who adopt identify technical and organizational solutions to overcome these barriers. Adaptation costs matter when e-commerce represents a significant share of the activity and requires re-engineering. The most intensive users of digital technologies are then split into two groups. The first one is composed of firms that are not reluctant to use the technology, but whose downstream market is not adapted to digital transactions (C4). They therefore buy online without selling online. The firms in the second group overcome most of the barriers. They therefore buy and sell online quite intensively.

Our analysis of barriers suggests that this notion of barriers is difficult to interpret since barriers are both objective and subjective. There are objective barriers such as the re-engineering costs or the fact that consumers do not value online transactions. This leads firms, given their activity, to not adopt e-commerce practices because it would not be profitable to do so. There are more subjective barriers. Typically, institutional barriers belong to this category in Europe since the legal framework, while imperfect, does not radically forbid implementing successful online business operations. A wider diffusion of e-commerce relies on both an evolution of "objective" factors, like the rate of equipment of households with the

Internet, and of subjective factors, like the CEO's opinion on the institutional environment friendliness.

This is confirmed by Table 14, in which we cross our two cluster analyses of drivers and barriers to e-commerce:

- The majority of "inert" firms consider either being not confronted with significant barriers, or facing compatibility barriers.
- The mode for adaptive firms is to be confronted with internal adaptation costs.
- Pro-active firms either consider being not affected by barriers, or having to overcome internal adaptation problems.
- Those firms that are sensitive to governmental incentives are logically sensitive to institutional barriers.

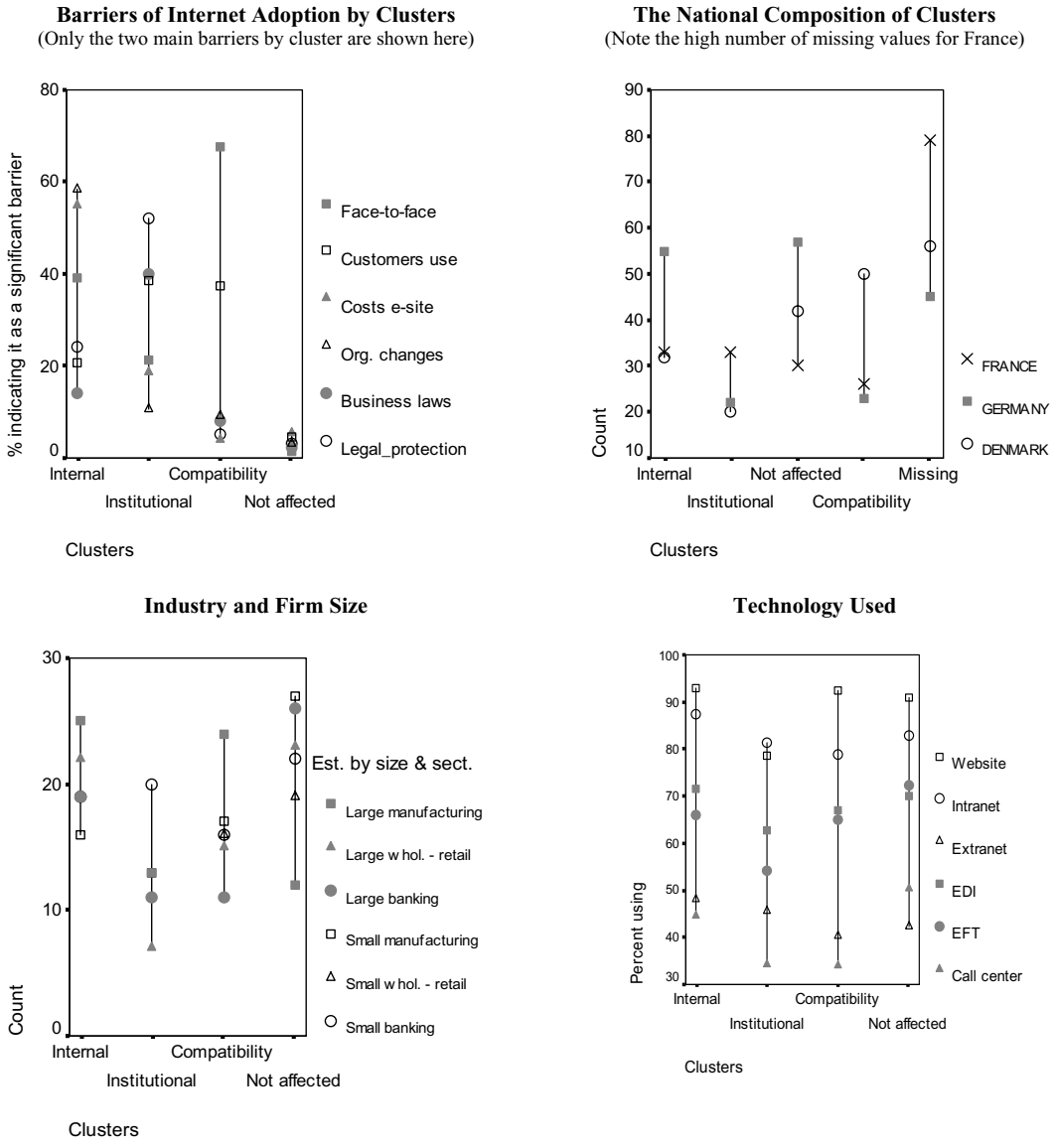
The company that assesses they are not affected by any type of barrier, can in fact be either intensive users, or inert. Subjectivity matters since non-users can estimate that there are no barriers simply because they did not experience them. At the same time, it is clear that there are also objective assessments. Pro-active adopters are less sensitive to potential barriers than the other categories, and adaptive adopters clearly face a complex and costly process of business process reengineering.

Table 14: The Cross-Perception of Barriers and Drivers

Clusters (barriers)	Clusters (drivers)			
	Inert	Adaptive	Proactive	Government
Internal	20%	39%	26%	21%
Institutional	18%	13%	20%	30%
Not affected	35%	24%	32%	32%
Compatibility	27%	24%	22%	17%
	100%	100%	100%	100%

Source: CRITO Global E-Commerce Survey 2002, own calculations, unweighted

Figure 8: A Cluster Analysis of the Opinions about Barriers to E-business Adoption in Europe



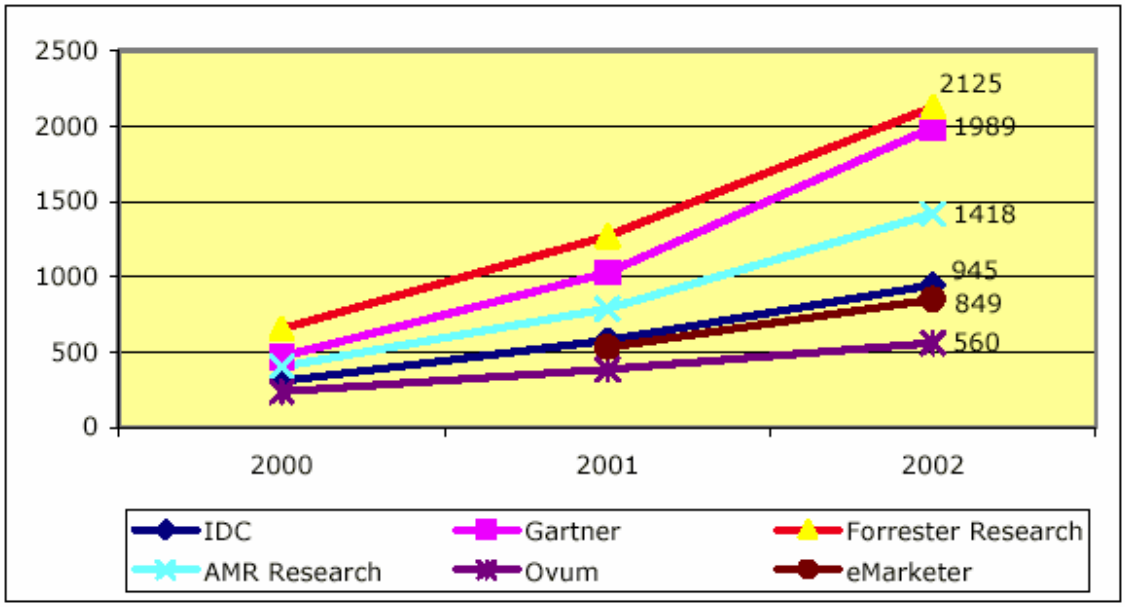
Source: CRITO Global E-Commerce Survey 2002, own calculations, unweighted

This hierarchization of the barriers to e-commerce discriminates countries. Danish firms are those that are more concerned by the ability of their business to be digitized. The barriers linked to reorganization costs, especially for large manufacturing firms, essentially concerns Germany. There are also many German firms in the cluster that do not identify major barriers to e-commerce adoption. French firms are split among the four groups. This confirms our idea that there are digital divides among firms that explain, both in static and in dynamics, the low average level of adoption of e-commerce in France.

DIFFUSION OF E-COMMERCE

As pointed out in Brousseau (2000), since there is no agreement on the definition of what e-commerce is, and since many online transactions do not rely on the Internet in France,[21] and since assessment methods differ strongly among organizations producing e-commerce figures, assessments about e-commerce are quite heterogeneous and it is difficult to proceed with international comparisons. However, most of the available figures converge to point out that the French trend is parallel to the global one (Figure 9). Online sales continued to grow in 2002. B2B seems to grow at a faster rate than B2C (while we only received global figures for B2B - Table 12, and French figures for B2C- Figure 10). B2B growth seemed to accelerate in 2002, while the rate of growth diminished in B2C.

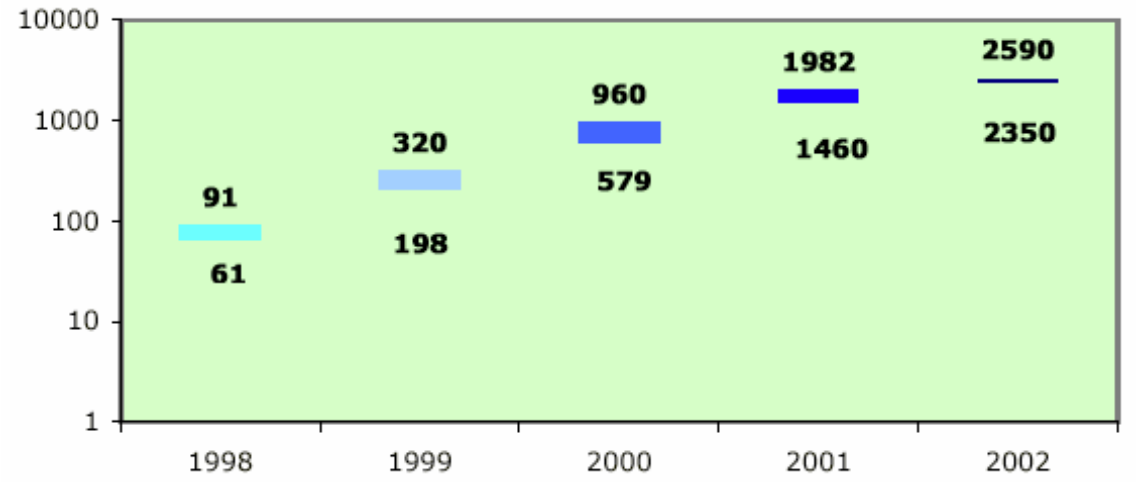
Figure 9: Trend in Global B2B Market, 2000 to 2002 (billions of euros)



Source: Based on IDC (November 2001), Gartner Group (May 2002), eMarketer, Forrester, AMR and Ovum (June 2002)

[21] For 2000, IDC estimated B2B French e-purchases (excluding EDI) to be 6.1 billion euros, while Edifrance assessed that total EDI purchases accounted for 120 billion euros.

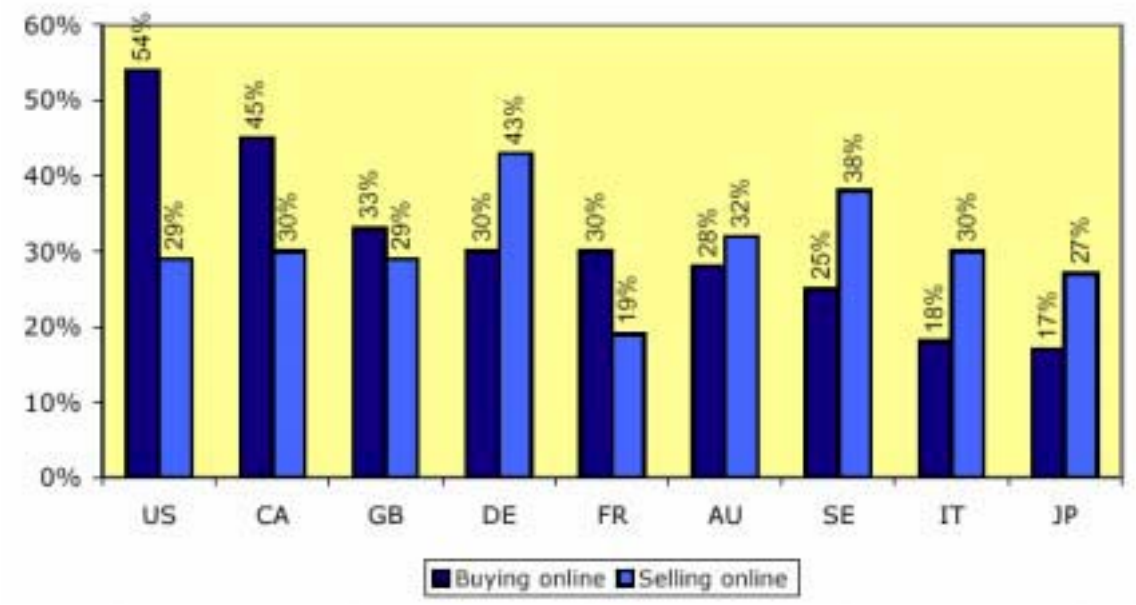
Figure 10: Total Online B2C Purchases (millions of euros), France, 1998 to 2002 (maximum and minimum estimates)



Sources: Forrester Research Benchmark Group, Jupiter MMXI, IDC, Médiangles
*For 2002, the estimates are from Forrester Research, Benchmark Group and Jupiter MMXI

When France is compared to the other European countries, the situation is contrasted between B2B and B2C. In general, France performs poorly compared to the countries with the same level of development. However, this relative performance is clearly poorer in B2B than in B2C (Figure 11, Table 15). French firms are reluctant to sell online, but not to buy online. This is consistent with our analysis of the barriers and drivers to e-commerce.

Figure 11: Businesses Buying and Selling Online, by Country, 2nd Quarter 2001 (%)



Source: DTI International Benchmarking Study 2001

Table 15: Scoreboard of the European E-Commerce

	Germany	Belgium	Spain	France	Italy	UK
Internet sales (Billions of Euros)	4.86	0.077	0.525	1.45	0.423	6.35
Cyber-consumers (% of Population)	26	23	10	19	7	23
Online Advertising (Millions of Euros)	180	10.9	51.6	153	N/A	263

Source: Le Journal du Net, 2003

The panel does not fully reflect this (Table 16). It is confirmed that French firms perform poorer than the average firm worldwide. However, the gap between French firms and the average is less important in B2C than in B2B, both in terms of number of users and in terms of shares of online sales in total sales. This is because the survey considers Internet e-commerce only, while we know that most of the French B2B e-commerce is based on non-Internet technologies (and that this phenomenon is clearly stronger in France than abroad; Figure 3). The only figure for which France is clearly above the global average is online payments. This confirms the idea that French Internet applications are more integrated than those of their foreign counterparts. Online services are more complete when implemented (see Table 20).

Table 16: Online Sales, 2002

	Establishment Size[a]		Sector[b]			Total	
	SME	Large	Mfg.	Distrib.	Finance	France[c]	Global[d]
Type of Online Sales[e]							
B2B only	6.5	8.2	16.0	3.8	3.7	6.6	12.9
B2C only	4.3	12.1	4.7	4.0	7.7	4.5	7.1
Both B2B and B2C	3.8	5.9	4.4	3.7	3.6	3.9	15.0
Mean percent of total consumer sales conducted online (all establishments)[f]	0.2	0.5	0.2	0.1	1.1	0.2	3.8
Mean percent of total business sales conducted online (all establishments)[g]	0.0	0.3	0.1	0.0	0.1	0.0	4.0
Mean percent of total consumer sales conducted online (only those doing B2C sales online)[f]	3.8	4.1	4.8	1.1	9.5	3.8	18.6
Mean percent of total business sales conducted online (only those doing B2B sales online)[g]	0.2	6.9	0.4	0.0	7.7	0.3	15.1
Percent of websites that support online payment (only those doing online sales)	50.2	24.4	0.0	99.3	8.3	49.3	33.6

Source: CRITO Global E-commerce Survey, 2002

Notes: [a] SME (small and medium sized establishments) are those with 25-250 employees; large are those with more than 250 employees.
[b] Manufacturing includes all establishments classified as SIC 20-39; distribution includes wholesale and retail (SIC 50-54, 56-57, 59); finance includes banking and insurance (SIC 60-65).
[c] Responses were weighted based on the total number of establishments by employee size within the sector for each country. Survey sample sizes for France by sector are 68 establishments in manufacturing, 64 in wholesale & retail distribution, and 69 in banking & insurance; by size are 101 establishments classified as SME and 100 as large.
[d] Consists of weighted survey responses in 10 countries combined: United States, Mexico, Brazil, Germany, France, Denmark, Singapore, Taiwan, China and Japan. "Global" sample sizes by sector are 743 in manufacturing, 701 in wholesale/retail distribution, and 695 in banking & insurance; by size are 1,088 establishments classified as SME and 1,053 as large.
[e] Percents are based on the full sample (all establishments). Exact wording of question: Are these online sales to other businesses or to consumers or to both?
[f] Exact wording of question: What percent of your establishment's total consumer sales are conducted online?
[g] Exact wording of question: What percent of your establishment's total business to business sales are conducted online?

The same bias seems to apply to the data related to online procurement. While aggregated figures at the national level show that French firms perform as the average European firm (Figure 11), the survey data shows a significantly poor performance by France (Table 17). The combined effects of the "Internet bias," selection bias, missing answers, and of weighted

measures might result in figures that seem inconsistent, both with the general information we have on the specificity of French firms, and the analysis of the other items in this survey.

Table 17: Online Procurement, 2002

	Establishment Size[a]		Sector[b]			Total	
	SME	Large	Mfg.	Distrib.	Finance	France[c]	Global[d]
Percent of establishments doing online purchasing	24.3	37.3	18.2	25.4	33.5	24.6	50.8
Mean percent of money spent for direct goods for production is ordered online (all establishments)[e]	2.4	5.8	2.6			2.6	8.3
Mean percent money spent on goods for resale is ordered online (all establishments)[f]	3.0	6.0		3.0		3.0	6.8
Mean percent of the money spent on supplies and equipment for doing business is ordered online (all establishments)[g]	3.4	5.3	3.2	2.8	8.6	3.5	8.3

Notes:
[a] SME (small and medium sized establishments) are those with 25-250 employees; large are those with more than 250 employees.
[b] Manufacturing includes all establishments classified as SIC 20-39; distribution includes wholesale and retail (SIC 50-54, 56-57, 59); finance includes banking and insurance (SIC 60-65).
[c] Responses were weighted based on the total number of establishments by employee size within the sector for each country. Survey sample sizes for France by sector are 68 establishments in manufacturing, 64 in wholesale & retail distribution, and 69 in banking & insurance; by size are 101 establishments classified as SME and 100 as large.
[d] Consists of weighted survey responses in 10 countries combined: United States, Mexico, Brazil, Germany, France, Denmark, Singapore, Taiwan, China and Japan. "Global" sample sizes by sector are 743 in manufacturing, 701 in wholesale/retail distribution, and 695 in banking & insurance; by size are 1,088 establishments classified as SME and 1,053 as large.
[e] Question asked only to those in the manufacturing sector; percent based on all manufacturing establishments. Exact wording of question: What percent of the money your establishment spends on direct goods for production, such as parts and components, is ordered online?
[f] Question asked only to those in the wholesale/retail distribution sector; percent based on all wholesale/retail establishments. Exact wording of question: What percent of the money your establishment spends on goods for resale is ordered online?
[g] Percent based on all establishments. Exact wording of question: What percent of the money your establishment spends on supplies and equipment for doing business is ordered online?

Despite these biases, France performs poorly compared to other countries in the intensity of use of Internet based e-commerce. A smaller proportion of firms are involved in e-commerce, and French users seem to use the Internet less intensively either to buy or to sell than those abroad (Tables 16, 17).

The gap between French and foreign firms in the use of Internet based commerce is wider in B2B than in B2C. This is partly linked to the fact that French firms are intense users of B2B online coordination based on traditional technologies (Table 10). Moreover, French firms are also reluctant to buy and sell online because they value face-to-face relationships to perform business operations (Table 12). Both factors combine to explain why the French are so lightly involved in the development of Internet marketplaces (Table 18).

French firms are also specific, since they consider the Internet as a complimentary means to market their products and services, and not as a competitor or a substitute to traditional channels. Table 19 clearly shows that French banks and distribution companies target new markets when they go online. Manufacturing industries use the Internet as a complementary means to serve their traditional customers. These reflect the fact that French banks and distribution companies want to avoid cannibalization of their existing marketing channels by online channels. This is, moreover, consistent with the low diffusion of the Internet among French households and with the low propensity of French firms to buy online.

Table 18: Participation in an Internet-Based Trading Community, 2002

	Establishment Size[a]		Sector[b]			Total	
	SME	Large	Mfg.	Distrib.	Finance	France[c]	Global[d]
Percent who have heard of the concept of an Internet marketplace[e]	62.1	70.1	71.1	60.1	58.0	62.3	80.0
Percent participating as a buyer only[f]	4.6	4.7	0.5	6.0	5.0	4.6	6.7
Percent participating as a seller only[f]	7.7	5.8	14.7	6.1	0.1	7.6	12.2
Percent participating as both a buyer and a seller[f]	5.9	5.3	5.8	6.0	5.4	5.9	16.9

Source: CRITO Global E-Commerce Survey, 2002

Notes: [a] SME (small and medium sized establishments) are those with 25-250 employees; large are those with more than 250 employees.
[b] Manufacturing includes all establishments classified as SIC 20-39; distribution includes wholesale and retail (SIC 50-54, 56-57, 59); finance includes banking and insurance (SIC 60-65).
[c] Responses were weighted based on the total number of establishments by employee size within the sector for each country. Survey sample sizes for France by sector are 68 establishments in manufacturing, 64 in wholesale & retail distribution, and 69 in banking & insurance; by size are 101 establishments classified as SME and 100 as large.
[d] Consists of weighted survey responses in 10 countries combined: United States, Mexico, Brazil, Germany, France, Denmark, Singapore, Taiwan, China and Japan. "Global" sample sizes by sector are 743 in manufacturing, 701 in wholesale/retail distribution, and 695 in banking & insurance; by size are 1,088 establishments classified as SME and 1,053 as large.
[e] Exact wording of question: "Have you ever heard of the concept of an Internet marketplace, exchange or trading community, through which multiple businesses buy and sell goods and services?"
[f] Percents based only on those establishments which have heard of the concept of an Internet marketplace.

Table 19: How Establishments Use the Internet to Sell Products and Services, 2002

	Establishment Size[a]		Sector[b]			Total	
Percent indicating Internet used to …[e]	SME	Large	Mfg.	Distrib.	Finance	France[c]	Global[d]
Address new markets only	39.0	37.7	3.0	49.6	70.7	39.0	15.3
Address traditional distribution channels only	30.8	32.0	52.4	25.5	3.2	30.8	44.1
Compete directly with traditional distribution channels	24.4	30.3	23.3	24.9	26.0	24.6	27.4
Replace traditional distribution channels	5.9	0.0	21.2	0.0	0.0	5.6	13.2

Source: CRITO Global E-Commerce Survey, 2002

Notes: [a] SME (small and medium sized establishments) are those with 25-250 employees; large are those with more than 250 employees.
[b] Manufacturing includes all establishments classified as SIC 20-39; distribution includes wholesale and retail (SIC 50-54, 56-57, 59); finance includes banking and insurance (SIC 60-65).
[c] Responses were weighted based on the total number of establishments by employee size within the sector for each country. Survey sample sizes for France by sector are 68 establishments in manufacturing, 64 in wholesale & retail distribution, and 69 in banking & insurance; by size are 101 establishments classified as SME and 100 as large.
[d] Consists of weighted survey responses in 10 countries combined: United States, Mexico, Brazil, Germany, France, Denmark, Singapore, Taiwan, China and Japan. "Global" sample sizes by sector are 743 in manufacturing, 701 in wholesale/retail distribution, and 695 in banking & insurance; by size are 1,088 establishments classified as SME and 1,053 as large.
[e] Exact wording of question: "Which of the following statements best characterizes how you are using the Internet to sell products and services?"

The fourth French specificity in the matter of e-commerce is the sophistication of e-commerce sites in France (Table 20). Confirming our analysis which showed a deeper integration of French web services in the information system (Table 9), the survey points out that the French firms develop more complete and consistent services when they go online. This affirms that France, being a late adopter of the Internet while being an early adopter of digital technologies and e-commerce techniques, has a strong potential to catch up. On the one hand, many firms benefit from an existing digital capability and from know-how. On the other hand, by being followers, French firms can implement the most recent technologies and identify the relevant services to adequately meet customer needs.[22] At the same time, the low diffusion of

[22] This is true both for manufacturing and distribution firms. However, B&F companies remain far behind their foreign competitors in providing online services. This can be related to the combination of the low competitive pressure of their domestic markets with the fact that they implemented an information infrastructure that is specific to banks, and not designed in favor of providing digital services to customers.

the Internet in France and the complexity of the implemented web services hindered the development of e-commerce for the time being.

Table 20: Online Services, 2002

	Establishment Size[a]		Sector[b]			Total	
	SME	Large	Mfg.	Distrib.	Finance	France[c]	Global[d]
Type of Online Service[e]							
B2B only	7.8	25.2	21.3	4.4	9.2	8.2	23.1
B2C only	15.9	26.1	12.3	17.7	12.2	16.2	12.9
Both B2B and B2C	18.7	22.1	11.9	21.4	13.2	18.8	33.3
Mean percent of total consumer services conducted online[f]	2.2	9.8	4.0	0.7	22.1	2.4	7.6
Mean percent of total business services conducted online[g]	13.1	16.5	20.3	1.4	0.4	13.2	11.0
Percent of manufacturing web sites which support[h]							
Product configuration	98.1	100.0	98.2			98.2	54.7
Order tracking	71.3	70.2	71.3			71.3	21.5
Service and technical support	98.3	70.2	97.2			97.2	54.4
Product specification	98.3	100.0	98.4			98.4	79.9
Account information	30.3	40.5	30.7			30.7	17.0
Percent of wholesale/retail distribution web sites which support…[h]							
Gift certificates and/or registry	50.0	40.0		49.9		49.9	20.6
Product catalogue	100.0	60.0		99.5		99.5	69.8
Product reviews	50.0	60.0		50.1		50.1	48.6
Ind. Customization	0.0	60.0		0.7		0.7	21.3
Account information	50.0	60.0		50.1		50.1	21.7
Percent of banking and insurance web sites supporting …[h]							
Online services such as filing applications, filing claims, paying bills, transferring funds	0.0	86.5			12.4	12.4	53.9
Access to account information	0.0	71.2			10.2	10.2	57.3
Online tools such as research tools, planning tools, etc.	0.0	22.1			3.2	3.2	52.0

Source: CRITO Global E-Commerce Survey, 2002

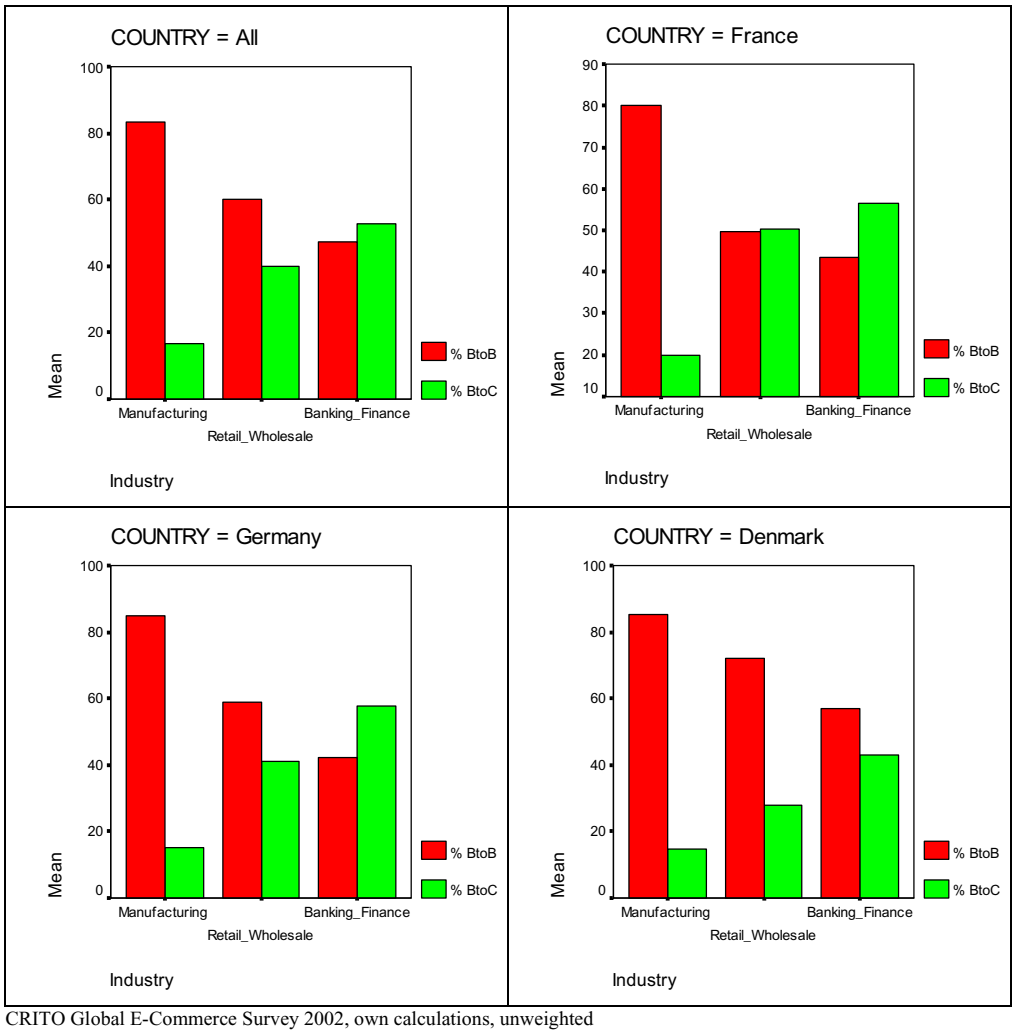
Notes: [a] SME (small and medium sized establishments) are those with 25-250 employees; large are those with more than 250 employees.
[b] Manufacturing includes all establishments classified as SIC 20-39; distribution includes wholesale and retail (SIC 50-54, 56-57, 59); finance includes banking and insurance (SIC 60-65).
[c] Responses were weighted based on the total number of establishments by employee size within the sector for each country. Survey sample sizes for France by sector are 68 establishments in manufacturing, 64 in wholesale & retail distribution, and 69 in banking & insurance; by size are 101 establishments classified as SME and 100 as large.
[d] Consists of weighted survey responses in 10 countries combined: United States, Mexico, Brazil, Germany, France, Denmark, Singapore, Taiwan, China and Japan. "Global" sample sizes by sector are 743 in manufacturing, 701 in wholesale/retail distribution, and 695 in banking & insurance; by size are 1,088 establishments classified as SME and 1,053 as large.
[e] Percents are based on the full sample (all establishments). Exact wording of question: "Are these online services to other businesses or to consumers or to both?"
[f] Percents are based on the full sample (all establishments). Exact wording of question: "What percent of your establishment's total services to consumers are conducted online?"
[g] Percents are based on the full sample (all establishments). Exact wording of question: "What percent of your establishment's total services to businesses are conducted online?"
[h] Percents are based on only those establishments which have a web-site and conduct business within the specified sector.

Intra-Europe comparisons of the distribution between B2B and B2C sales shows first, that the French profile is close to the European average and that, generally speaking, the relative level of development of B2B versus B2C in various industries in the three surveyed countries is almost stable (Figure 12). B2B dominates in the manufacturing industries, while B2C dominates in banking and finance. This is true in France as well, with two specificities. B2B

is not dominant in the distribution industry, while it is the dominant segment of online sales in Germany and Denmark. B2C is dominant in the French finance industry (as it is in Germany), while B2B is the principal application in Denmark.

In addition, these figures allow us to point out that the drivers/inhibitors to e-commerce differ greatly from one industry to another. In the manufacturing industries, the low propensity of the population to use the Internet should not matter much since the targeted market is clearly B2B. However, manufacturing companies are victims of the digital divide among French firms that delay Internet and e-commerce adoption. The digitization of B2C in retail trade or in banking is much more sensitive to the behavior of consumers.

Figure 12: Percentage of B2B v. B2C[23]Percentage of B2B v. B2C



Source: CRITO Global E-Commerce Survey 2002, own calculations, unweighted

[23] The percentage computed in this figure might seem inconsistent with those highlighted in Table 16. In fact, Table 16 percentages are computed on the basis of the whole sample. They include missing values, which leads to underestimating French figures, since the rate of incomplete questionnaires is significantly higher in the French sample. Figure 12 is computed over the sub-sample of firms that sell online and that provide information about the distribution of their sales.

One can try to rely on the likelihood of firms to sell online and their characteristics to get a better understanding of the drivers and inhibitors to e-commerce. Kraemer, Gibbs, and Dedrick (2003) point out that B2B online sales are positively correlated to the degree of globalization. In a sense, Figure 12 seems to confirm this correlation since Denmark, being more internationalized, is also the country where B2B e-commerce is predominant (while B2C online sales represent a greater share of sales than in any of the other European countries; see Appendix 1). One can question the causal relationship behind this positive correlation. Indeed, B2B is primarily predominant in the manufacturing industries, then in the distribution industry, and is less developed in banking and finance. The hierarchy is inversed for B2C. B2B is then, predominant in all the national manufacturing industries, while B2C is dominant in banking and finance. The former operates more globally than the latter which is more local. However, it might be that the correlation between the degree of internationalization and the likelihood to develop either B2C or B2B online sales is purely incidental. Since banks already operate EFT systems, in fact, often electronic clearing systems with their main partners, the other banks see the Internet mainly for B2C support. Indeed, the Web is particularly efficient for supporting retail banking (while too insecure to really support high value financial transactions). Manufacturing industries are a primary concern of B2B since most of their produced goods are brought to the final consumers through retail distribution networks. Most of their clients are business customers, with either manufacturing or service companies, or distribution firms. They therefore focus on B2B and see the Internet as both a complement and as a substitute to the means they were using formerly: from sales forces to online stores, and EDI relying on traditional network technologies.

Furthermore, we performed an econometric analysis based on a legitimate model. We wanted to test the likelihood of firms to sell online. We considered two sets of explaining variables:

1. The technological (Internet) "maturity":

   Online sales should be positively correlated to the use of web-technologies — website, intranet, extranet, or to technologies associated to the web (call center) (H1).

   However, it should be negatively correlated to the use of standard EDI since we identified this factor as an inhibitor to e-commerce because of switching costs and because the use of the Internet does not always provide significant productivity gains compared to the use of EDI (H1).
2. The competitive pressure that should be positively correlated to this technique that is supposed to reduce supplying cost or to improve the service (H2). The competitive pressure is measured both by the level of local and international competitive pressure.

In addition, we control a number of variables:

- Whether the establishment gets revenue from sales, since it is a proxy of its commercial nature (see Table 3) (+).
- The nationality of the establishment: the location in France having a negative influence (-).
- The industry.
- The commercial constraints characterizing the product that might require face-to-face interaction meeting to be sold (-).
- The size.

Table 21 shows our results:

Table 21: A Logit Test on the Probability to Sell Online

```
Logit estimates                   Number of obs  =    527
                          LR chi2(11)   =   149.58
                          Prob > chi2   =   0.0000
Log likelihood = -267.96622           Pseudo R2    =   0.2182

------------------------------------------------------------------------------
      q24b |   Coef.  Std. Err.   z  P>|z|   [95% Conf. Interval]
-------------+----------------------------------------------------------------
   EDI_Std | -.7115398  .2558999  -2.78  0.005  -1.213094  -.2099852
  web_site |  1.905145  .6400113   2.98  0.003   .6507461  3.159544
  intranet |  .6039271  .3390529   1.78  0.075  -.0606044  1.268459
  extranet |  .7567794  .2199473   3.44  0.001   .3256907  1.187868
call center|  .6717302  .215742    3.11  0.002   .2488837  1.094577
   comp_in |  .2429689  .0835185   2.91  0.004   .0792757  .4066621
  comp_out | -.2195645  .0825415  -2.66  0.008  -.381342  -.0577861
   gen_rev |  1.033486  .3604372   2.87  0.004   .3270423   1.73993
    face_f | -.2669827  .0795681  -3.36  0.001  -.4229333 -.1110321
    france | -.5307709  .2576305  -2.06  0.039  -1.035717 -.0258244
  manufact | -.7563849  .2461196  -3.07  0.002  -1.238771 -.2739994
     _cons | -3.423428  .7894209  -4.34  0.000  -4.970664 -1.876191
------------------------------------------------------------------------------
```

Source: CRITO Global E-Commerce Survey 2002, own calculations, unweighted

Our control variables have all the expected signs and are significant (except for the size of the company that is not significant at the European level, while it is for France).

H1 is confirmed, while the Intranet indicator is significant at only 10%. This confirms the low quality of this proxy as an indicator of advanced Internet use (see the comments of Table 10). H1 is also confirmed. This is not surprising since we already performed a Chi square test to check this negative correlation between EDI and e-commerce (Table 12).

H2 is confirmed for the competitive pressure at the national level only. Local pressure is not significant and the global pressure seems to have a surprisingly negative influence. This confirms, at least, that the causal relationship between globalization and the use of e-commerce is complex.

As pointed out in Brousseau & Kraemer (2002), the most significant e-commerce players are subsidiaries (and even departments) of large firms, generally involved in the distribution industry. There are few pure players in France. Those that exist are either subsidiaries of US pure players like Amazon, e-Bay or Yahoo, or small independent firms organized on a craft shop model. For instance, with the online distribution of computers and related products, a set of very small discounters compete with larger sites, like those of the specialized retailers or those of the computer manufacturers, by aggressively discounting outdated products. While these sites tend to develop a strong price competition in a very specific niche of the market, their sales remain marginal in volumes. They are often operated by independent entrepreneurs, who do everything on their own; from the mastering of their website to making deliveries.

While a significant number of independent craft-retailers are active at the fringes of the market, the bulk of e-commerce is quite concentrated around a limited number of large players. They are subsidiaries of major retailers or major players in the related industry (e.g. travel). However, since the French online market remains small, this did not crucially modify the industry structure. For most players, e-commerce remains an experimental field of what is considered to be complementary to their traditional activities. Most players seek to maintain positions in e-commerce in order to watch what is going on, and to incrementally invest in the required knowledge and assets to be present if the market were to develop.

IMPACTS OF THE INTERNET AND E-COMMERCE

Since France follows a specific path of development in matters of e-commerce, the impact of e-commerce in France is specific, compared to what happens at the global level. Since French firms develop e-commerce systems that are strongly integrated within their internal operations (Table 9) and do not seek to develop sales (Table 19), online business has a major impact on the efficiency of internal operations and on staff productivity (especially in the distribution industry and in small firms), and on the efficiency of the coordination with suppliers, but essentially in the manufacturing industry (Table 22). Of course, firms also report enhanced services to customers (especially in manufacturing), but this effect is less intensive in France than it is abroad. Moreover, French firms do not report any significant impact of e-commerce on volume sold. They do not see the Internet as a new marketing channel (Table 23).

SMEs tend to report a greater impact of e-business on many operations (Tables 22, 23). This could be seen as surprising, since SMEs are less intensive users than large companies. This is probably linked to the fact that large companies were already performing e-business operations before the rise of the Internet. For them, the impact of Internet-based commerce is less significant than SMEs, since they already had re-engineered part of their operations to have them compatible with e-business practices as just-in time operations.

Table 22: Impacts of Doing Business Online, 2002

	Establishment Size[a]		Sector[b]			Total	
Percent indicating high impact[e]	SME	Large	Mfg.	Distrib.	Finance	France[c]	Global[d]
Internal processes more efficient	38.0	34.4	26.8	43.9	23.3	37.9	33.9
Staff productivity increased	26.4	17.9	16.9	30.7	14.2	26.2	27.2
Sales increased	9.3	8.3	2.4	12.4	3.7	9.3	20.5
Sales area widened	18.9	25.3	10.7	21.5	21.9	19.1	31.4
Customer service improved	23.9	28.9	28.0	23.0	22.4	24.1	34.8
International sales increased	13.1	11.6	5.0	17.3	8.8	13.0	19.5
Procurement costs decreased	6.9	2.6	12.5	4.9	5.0	6.7	17.7
Inventory costs decreased	3.8	3.3	13.2	0.0	6.7	3.8	14.0
Coordination with suppliers improved	24.2	28.0	30.6	21.7	24.4	24.3	29.8
Competitive position improved	12.2	22.8	6.6	14.9	10.5	12.5	29.8

Source: CRITO Global E-Commerce Survey, 2002

Notes: [a] SME (small and medium sized establishments) are those with 25-250 employees; large are those with more than 250 employees.
[b] Manufacturing includes all establishments classified as SIC 20-39; distribution includes wholesale and retail (SIC 50-54, 56-57, 59); finance includes banking and insurance (SIC 60-65).
[c] Responses were weighted based on the total number of establishments by employee size within the sector for each country. Survey sample sizes for France by sector are 68 establishments in manufacturing, 64 in wholesale & retail distribution, and 69 in banking & insurance; by size are 101 establishments classified as SME and 100 as large.
[d] Consists of weighted survey responses in 10 countries combined: United States, Mexico, Brazil, Germany, France, Denmark, Singapore, Taiwan, China and Japan. "Global" sample sizes by sector are 743 in manufacturing, 701 in wholesale/retail distribution, and 695 in banking & insurance; by size are 1,088 establishments classified as SME and 1,053 as large.
[e] Exact wording of question: "Using a 5-point scale where 5 is "a great deal" and 1 is "not at all", please rate the degree to which your establishment has experienced the following impacts since it began using the Internet for business. A score of 4 or 5 was classified as "high impact"."

As pointed out in Brousseau (2000, 2001) and in Brousseau & Kraemer (2002), e-business in France is mainly seen as a way to re-engineer inter-firm relationships in order to benefit from more efficient cooperative operations. Consequently, B2C is considered less strategic than B2B, and the development of B2B is based on the implementation of inter-firm coordination means rather than electronic marketplaces. This explains why French firms continue to massively use traditional EDI that is well adapted to inter-firm cooperation, while it is poorly adapted to online sales (Figure 3), and why the same firms are so lightly involved in the development of e-marketplaces (Table 18). It is not surprising to assess that French firms do not perceive the Internet as a means to increase the number of their suppliers (Table 23). Moreover, since online markets did not develop, and since the Internet is not used as a new

distribution channel, the development of e-commerce has no significant impact on the number of competitors.

At the same time, the intensity of competition increases significantly, with the development of e-commerce, while it rises less intensively in the global market. While French firms see the Internet as a way to enhance the efficiency of interfirm cooperation, it is not at all a tool for sustaining collusive behaviors. In an open economy, as France is, enhanced cooperation among firms seems to be a response to the more intensive competitive pressure. The flexibility of digital technologies allows us to question at any point of time the relevancy of existing cooperative links, since the technology tends to decrease the costs of switching to other partners. The technology increases the "contestability" of partnership, and therefore it increases competition without leading to the rise of new markets.

Table 23: Impacts of Doing Business Online, 2002

	Establishment Size[a]		Sector[b]			Total	
Percent indicating[e]	SME	Large	Mfg.	Distrib.	Finance	France[c]	Global[d]
Number of distribution channels increased	20.1	24.0	14.1	21.9	26.0	20.2	40.2
Number of suppliers increased	16.0	10.1	22.2	13.5	16.7	15.9	29.9
Number of competitors increased	11.3	8.8	2.5	13.4	17.1	11.2	27.9
Intensity of competition increased	34.3	21.2	37.0	32.6	34.6	33.9	41.5

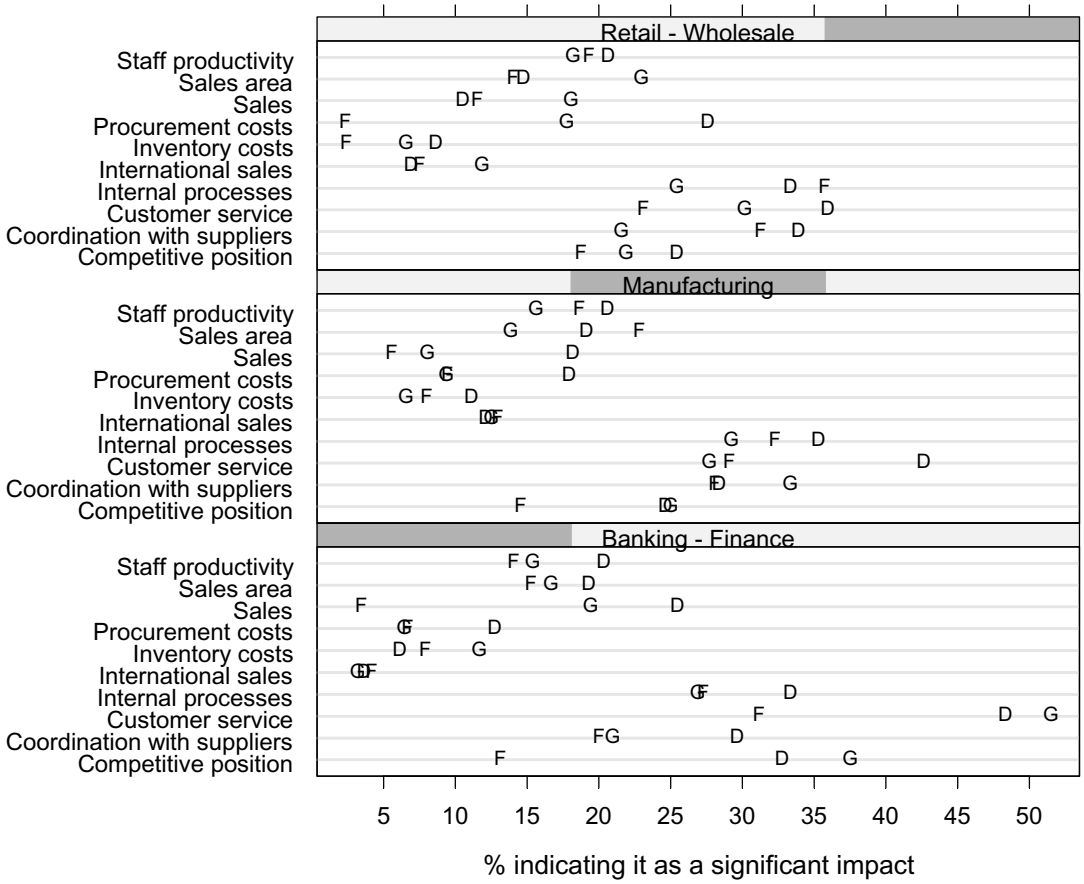
Source: CRITO Global E-Commerce Survey, 2002.

Notes: [a] SME (small and medium sized establishments) are those with 25-250 employees; large are those with more than 250 employees.
[b] Manufacturing includes all establishments classified as SIC 20-39; distribution includes wholesale and retail (SIC 50-54, 56-57, 59); finance includes banking and insurance (SIC 60-65).
[c] Responses were weighted based on the total number of establishments by employee size within the sector for each country. Survey sample sizes for France by sector are 68 establishments in manufacturing, 64 in wholesale & retail distribution, and 69 in banking & insurance; by size are 101 establishments classified as SME and 100 as large.
[d] Consists of weighted survey responses in 10 countries combined: United States, Mexico, Brazil, Germany, France, Denmark, Singapore, Taiwan, China and Japan. "Global" sample sizes by sector are 743 in manufacturing, 701 in wholesale/retail distribution, and 695 in banking & insurance; by size are 1,088 establishments classified as SME and 1,053 as large.
[e] Exact wording of question: Please indicate whether the following have increased, decreased or stayed the same in your establishment since it began using the Internet for business.

Focusing on the European case allows us to go deeper into the details of the French specificity, and of the various industries as well (Figure 13).

The bank and finance industry uses the Internet to enhance its customer service. On the contrary, it remains a local industry and does not seek to use digital technologies to increase its international sales. The distribution industry focuses on the reduction of procurement costs. Generally speaking, enhanced customer service is the most significant impact reported in the three surveyed industries. Compared to this European profile, the French industry remains specific. We mentioned above that the French do not use the Internet to enhance customer services, but rather to enhance upstream and related internal operations. Moreover, the Internet is not perceived by French banks as a means to significantly impact sales (while they recognize that it is a marketing channel for new entrants, Table 23). In addition, the distribution companies do not see the Internet as a way to save on procurement costs. The French manufacturing industry is the only industry which seems to behave as the average European (manufacturing) firm does. E-business has impacts primarily on internal processes and customer service. However, as identified in the other industries, it has no impact on procurement and inventory costs. This confirms this idea that French firms do not see the Internet as a vector for more competitive (procurement) markets. E-business is considered as the development of EDI applications.

Figure 13: The Impacts of the Internet in Europe



Source: CRITO Global E-Commerce Survey 2002, own calculations, unweighted
D = Denmark; F = France; G = Germany.

A principal component analysis enables us to contrast between two types of impacts of e-business (Table 24). On the one hand, the use of e-business impacts the internal efficiency by reducing costs. On the other hand, the use of the Internet based commerce discriminates among companies that enhance their commercial performances, mainly by increasing sales. In both cases, these axes enable us to strongly discriminate among the individuals within the population.

Table 24: Rotated Component Matrix of the E-Commerce Practices in Europe

		Component		Cronbach's alpha
		1	2	
Internal efficiency 42.3 % of the total variance	Coordination with suppliers improved	.762		.76
	Procurement costs decreased	.729		
	Internal processes more efficient	.702		
	Inventory costs decreased	.687		
	Staff productivity increased	.624		
Sales performance 16.2 % of the total variance	Sales area widened		.866	.77
	International sales increased		.774	
	Sales increased		.754	

Source: CRITO Global E-Commerce Survey 2002, own calculations, unweighted Extraction.
Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization. Only absolute values superior to 0.4 58.5% of the total variance is explained by the two first discriminating axis

In that case, we based our clustering on the ascending hierarchy methodology on the basis of the Ward criteria. It enabled us to identify three main categories of firms (Figure 14).

1. C1 groups 179 firms that both enhance their internal efficiency and develop sales.
2. C2 is composed of 103 firms that enhance their internal efficiency but do not develop sales.
3. The 136 individuals in C3 are not significantly impacted by e-business.

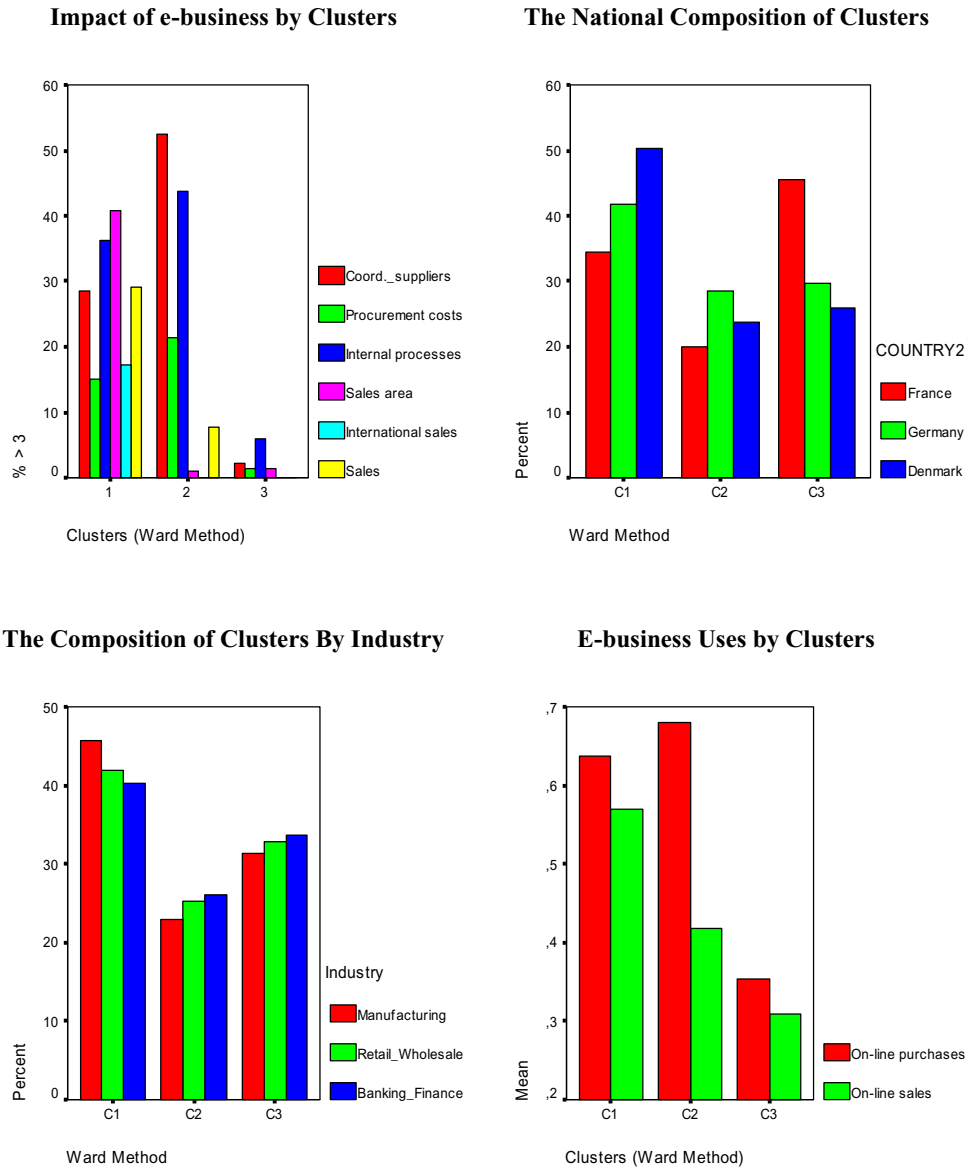
As expected, Danish firms are dominant in C1, while French firms are dominant in C3, and German firms were the second group in each case, and dominant in C2.

While not surprising, either, it is interesting to point out that the firms that report an enhancement of their efficiency without a development of their sales (C2) are the more likely to buy online, while the firms stating a development of their sales (C1) are significantly greater users of the Internet to sell online.

It is interesting to note that the firms that enhance both categories of operations (C1) perform worse in matters of internal efficiency enhancement than the firms that focus on the reduction of their costs (C2). This seems to indicate that firms focus either on reducing costs or in developing sales when going online. It is also important to point out that the expansion of sales strategy focuses on the national market. European firms do not use e-commerce to deepen their degree of internationalization. This might explain why the global competitive pressure is not such an important driver of online sales (Table 21). Last, but not least, it is important to point out that the enhancement of internal efficiency relies less on the reduction of procurement costs, than on the enhancement of the coordination within the firms and between the firm and its suppliers. This confirms the idea that an e-marketplace is less strategic than inter-firm information systems to support cooperative processes.

The three surveyed industries seem quite similarly represented in the three groups. While the manufacturing industries are dominant in C1 and the finance in C2 and C3, it is difficult to conclude that there is a significant sectoral effect.

Figure 14: A Cluster Analysis of the Impact of E-Business on European Firms



Source: CRITO Global E-Commerce Survey 2002, own calculations, unweighted

Due to the fact that we are still at the beginning of a process of diffusion of new business practices, and since the rate of adoption is still tiny in Europe and in France, it is quite impossible to clearly identify the impact of e-business practices on the efficiency and on the structure of industries. E-commerce seems to affect competition in a very indirect way. E-commerce does not necessarily mean new entry, or internationalization of activity. Therefore, it is hard to disentangle the impact of e-commerce from the impact of other factors like the growing globalization of the economy. Undeniably, those e-business technologies lead French firms to reorganize their processes to better meet the requirements of international competition. At the same time, France is in a process of gradual change. The slow pace of change is due to the fact that French businesses focus on the re-engineering of operations.

This requires organizational changes both at the firm and at the inter-firm levels, and such changes require time. In addition, since the implosion of the Internet bubble, the pace of diffusion of e-commerce technologies and associated business practices has slow down. The process of economic change should therefore, be slow.

CONCLUSION

This paper largely confirms the line of analysis drawn in an earlier paper on the path of development of e-commerce in France (Brousseau, 2001; Brousseau & Kraemer, 2002). Due to the early adoption of e-commerce practices based on the former generation of online and digital technologies, French companies missed the opportunity to become early adopters of the Internet and related practices. Moreover, since these technologies, namely the Minitel, were available to the consumers as well, they hindered the development of both B2C and B2B Internet based commerce. The survey that was performed on over 200 companies in France confirmed the lower level of development of Internet supported e-commerce in France, compared to other countries with similar levels of development. Traditional technologies seem to provide French firms with satisfying solutions to support their operations.

It is important to point out that the survey analyzed in this paper enabled a better understanding of the complex impact of early adoption. Indeed, early adopters of information technologies and the early developers of online services should have been the early adopters of the Internet and related technologies since they benefited both from their digital literacy and sunk investments in reengineering of their operations. However, earlier investments might have prevented them from switching to the new technological base and related practices. The data suggests that the second effect is more important than the first.

This situation is in a sense, self-reinforcing, since the low level of development of the Internet does not incite potential adopters of the Internet and related practices to move their operations online. Of course, the situation will evolve when the rate of diffusion comes to a ceiling. After that, one should expect a skyrocketing rate of diffusion due to strong positive network externalities of adoption.

For the time being, several factors combine to result in a slow rate of adoption:

- The French industry remains characterized by digital divides among firms in function of their industry, size, and geographic location. This resulted in digital archipelagos in the middle of an non-digital ocean. This structure does not favor diffusion since these archipelagos correspond to clusters of firms relatively independent from the rest of the economy.
- The French distribution industry provided its consumers with quite efficient services that do not induce them to shop online.

In addition to these elements, early adoption strongly influences the French way of considering e-business and e-commerce. The French are original in the sense that they do not see digital networks primarily as marketplaces or place of exchanges. They should be the support for inter-firm coordination of operations, while most market transactions require face-to-face interaction. Second, they deeply integrate their online applications with their information systems. This is linked to the vision that e-commerce is before all, the deepening of a rationalization process of the industry. Both visions lead most firms involved in e-business to implement cooperation support systems rather than marketplaces, and to target

B2B rather than B2C. These have obviously had an impact on the pace of adoption and on the nature of e-commerce.

Therefore, French e-commerce is quite specific. It is rather weak in B2C as shown from comparisons abroad. It is stronger in B2B, but does not consist of handling online sales. Consequently, the French e-commerce impact is essentially on internal costs, while it does not really generate sales and impact competition.

However, there are contrasts among industries. Manufacturing is clearly the industry that leads the development of B2B, even if there are digital divides across manufacturing industries. The distribution industry seeks to develop online procurement to rationalize its operations. It is reluctant to develop B2C since it could cannibalize its traditional marketing channels. The French banks and finance companies are weak, protected within the national boundaries, and already operate an efficient payment system. Their incentives to go online are weak.

Appendix 1: Problems in Interpreting International Comparisons

Throughout this paper, we often point out the contrast between Denmark and France (and to a lesser extent with Germany). Elements other than intrinsic differences in behavior can explain these differences.

For instance, Danish firms report online sales far more often than German and French firms (Table A11). However, such results can be biased by differences in the structure of the sample. The reply rate was significantly higher in Denmark than in France and Germany, and less establishments report sales in France (which is not the case for Germany).

Table A11: Propensity of Firms to Sell Online in Different Countries

		Online sales		Total
		No	Yes	
COUNTRY	Denmark	98	102	200
	France	148	53	201
	Germany	105	97	202
Total		351	252	603

Source: CRITO Global E-Commerce Survey 2002, own calculations, unweighted

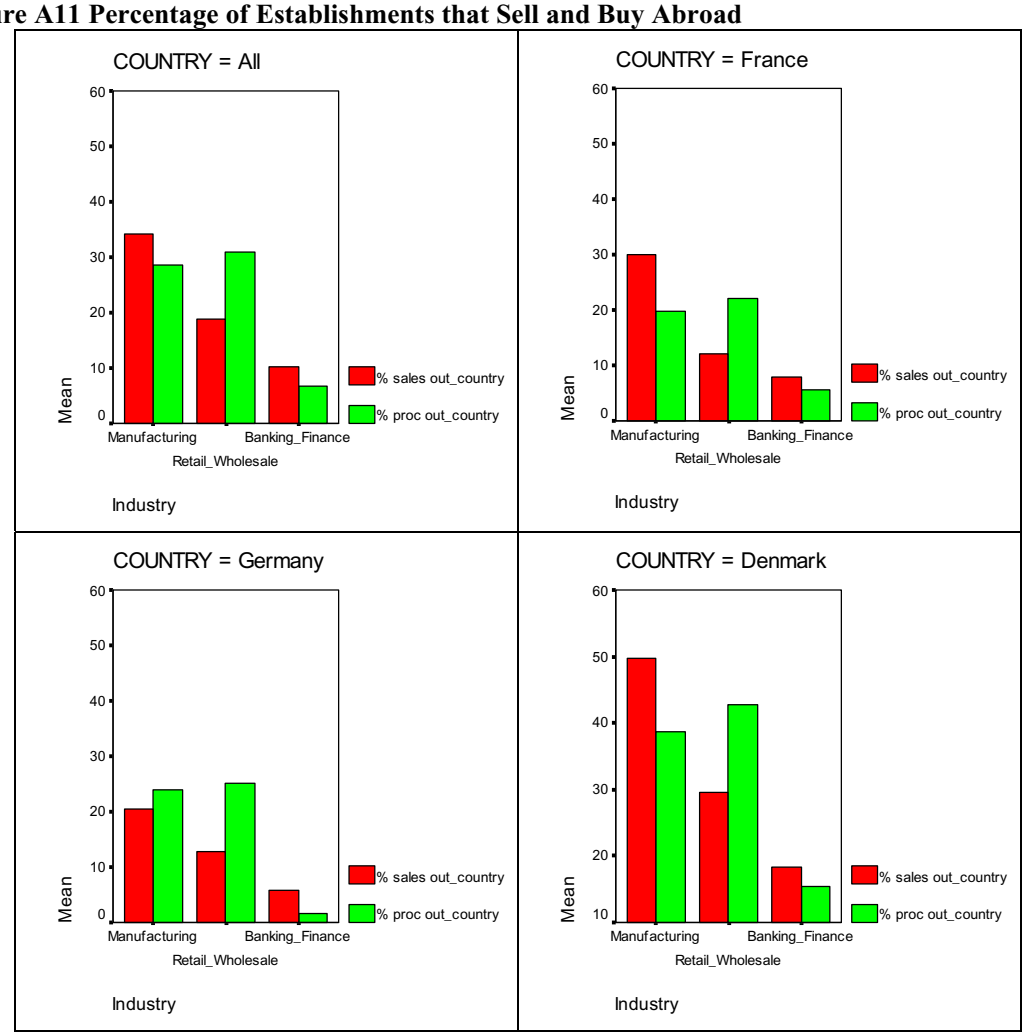
Above all, hidden differences between the structures of the samples could lead to misinterpretation. Let us take an example. The huge differences between Denmark, France and Germany in the likelihood to sell online could be related to the degree of globalization, since globalization should lead to more digitization of operations. This would be the case if one takes into account the Danish figures about globalization per se. Indeed, Danish firms have significantly more establishments outside the country (Table A12, Figure A11) and state to be more affected by international competition than French and German firms (Figure A12).

Table A12: Percentage of Establishments Related with Other Establishments and Headquarters in another Country

		Denmark	France	Germany
Establishments outside of country	No	86 43%	129 64%	111 55%
	Yes	113 57%	72 36%	91 45%
Headquarters located outside of country	No	167 84%	176 88%	164 81%
	Yes	32 16%	25 12%	38 19%

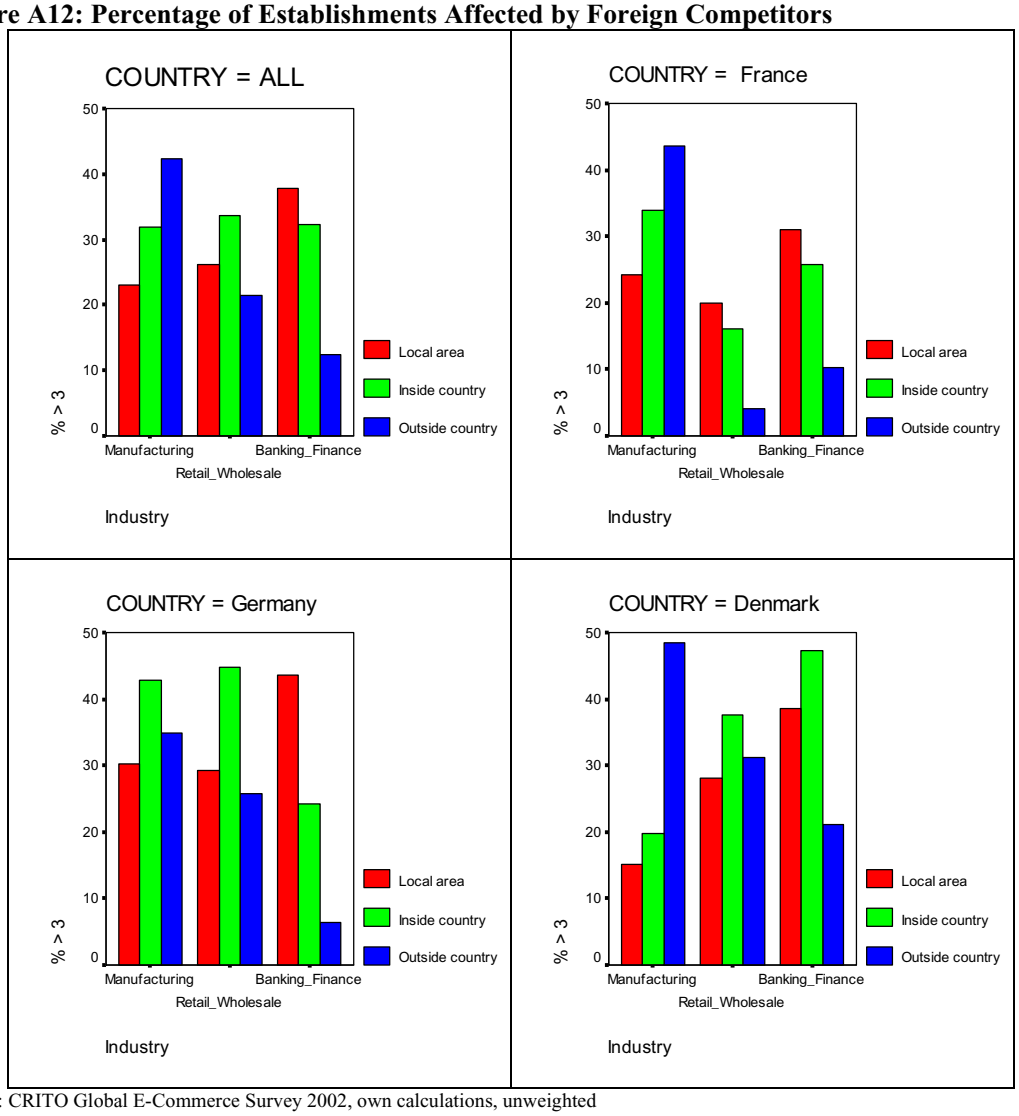
Source: CRITO Global E-Commerce Survey 2002, own calculations, unweighted

Figure A11 Percentage of Establishments that Sell and Buy Abroad



Source: CRITO Global E-Commerce Survey 2002, own calculations, unweighted

Figure A12: Percentage of Establishments Affected by Foreign Competitors



Source: CRITO Global E-Commerce Survey 2002, own calculations, unweighted

According to these figures, Danish industries seem to be more global than its foreign counterparts. However, one has to remember that Denmark is a small country. Firms are naturally led to operate in several countries if there are some economies of scale in their industry. This is less the case for large countries. Small countries' economies are often internationalized, but they interact mostly with their neighbors. Said another way, the trade that occurs among regions in large countries is considered international trade for small countries. Transborder statistics do not reflect the same realities for small and large countries since local trade and even regional trade is obviously quite different in nature than overseas trade.

This is confirmed by the following data. While Denmark seems to be far more global than France and Germany in our dataset (Table A3), its main partners are its neighbors. Denmark is less global than France and Germany if one considers the share of its non-EU exports and imports.

Table A13: The Importation/Exportation Structure of the Surveyed Countries

	Export Partners	Import Partners
Denmark	**EU 65.9%** (Germany 19.1%, Sweden 12.9%, UK 9.8%, France 5.0%, Netherlands 5.0%), US 5.9%, Norway 5.5% (2000)	**EU 69.7%** (Germany 21.1%, Sweden 12.3%, UK 8.6%, Netherlands 7.5%, France 5.2%, Italy 4.4%), US 4.1% (2000)
Germany	**EU 56%** (France 11%, UK 8%, Italy 8%, Netherlands 6%, Belgium / Luxembourg 5%), US 10%, Japan 2% (2000)	**EU 52%** (France 10%, Netherlands 9%, Italy 7%, UK 7%, Belgium/Luxembourg 5%), US 9%, Japan 5% (2000)
France	**EU 61%** (Germany 14%, UK 10%, Spain 9%, Italy 9%, Benelux 8%), US 9% (2000)	**EU 63%** (Germany 17%, Benelux 10%, Italy 9%, UK 8%), US 7% (2000)

Source: CIA, The World Factbook (2002) http://www.odci.gov/cia/publications/factbook/index.html

Our data set seems to show that French firms are less internationalized than German ones and that more German establishments have their headquarters abroad (Table A14). This is in question. While the German trade is more global than the French one, French firms seem to be more global than Germans. At least FDI statistic pointed out that for all of the 1990's, French outflows of capital were significantly more important than the German ones (2.11 versus 1.68% of GDP; see Brousseau and Kraemer, 2002). Inflow FDI statistics pointed out the same bias in favor of France and foreign subsidiaries that employ 27.8% of the workforce in the French manufacturing industry, versus 6% in Germany. This suggests that our various national samples can also be biased in terms of structure. They do not systematically reflect the actual structural differences among countries.

Figure A12 leads to an additional comment. We broke up the general statistics to point out the differences among industries in terms of sensitivity to international competition. Not surprisingly, in the three countries, manufacturing is more affected than retail and finance by international competition. As mentioned in section two, it is also interesting to point out that competition is essentially local in the bank and finance industry. However, these subjective assessments of the competition intensity can also be biased. For instance, the French seem to experience a less intense (global) competitive pressure than the German or the Danish. This can be discussed. First, in the French manufacturing industries, the global pressure might be quite strong, but not felt as globally since it is vectored by those subsidiaries of foreign firms that represent about a third of the French manufacturing industry. Moreover, in the retail industry, the French do not seem to experience global competition, while we mentioned in the former section that the French retailers are strong international competitors. They might not feel a strong competitive pressure since they are the leaders on many foreign markets.

All these elements led us to be quite careful in interpreting the data and the international comparisons. In many cases, we insist on the fact that the data we process enable us to draw conclusions at the firm level, but that we should be quite cautions when extrapolating to inter-country comparisons.

Table A14: Globalization Indicators, 2002

	Establishment Size[a]		Sector[b]			Total	
	SME	Large	Mfg.	Distrib.	Finance	France[c]	Global[d]
Percent of companies with establishments abroad	22.0	53.1	27.1	23.1	11.9	22.8	23.9
Percent of companies with headquarters abroad	6.7	21.7	18.7	3.7	4.2	7.1	8.5
Mean percent of total sales from abroad	14.4	30.1	21.9	13.5	9.0	14.7	12.1
Mean percent of total procurement spending from abroad	20.7	18.7	13.7	24.7	6.4	20.7	20.3
Degree affected by competitors abroad							
Low	71.8	41.2	34.0	80.2	90.5	71.0	68.3
Moderate	16.8	22.6	27.0	15.8	2.6	17.0	15.7
High	11.4	36.2	39.1	3.9	6.9	12.0	15.2

Source: CRITO Global E-Commerce Survey, 2002

Notes: [a] SME (small and medium sized establishments) are those with 25-250 employees; large are those with more than 250 employees.

[b] Manufacturing includes all establishments classified as SIC 20-39; distribution includes wholesale and retail (SIC 50-54, 56-57, 59); finance includes banking and insurance (SIC 60-65).

[c] Responses were weighted based on the total number of establishments by employee size within the sector of each country. Survey sample sizes for France by sector are 68 establishments in manufacturing, 64 in wholesale & retail distribution, and 69 in banking & insurance; by size are 101 establishments classified as SME and 100 as large.

[d] Consists of weighted survey responses in 10 countries combined: United States, Mexico, Brazil, Germany, France, Denmark, Singapore, Taiwan, China and Japan. "Global" sample sizes by sector are 743 in manufacturing, 701 in wholesale/retail distribution, and 695 in banking & insurance; by size are 1,088 establishments classified as SME and 1,053 as large.

[e] Exact question wording: Using a 5-point scale where 5 is significantly affected and 1 is not at all affected, please tell me how much your establishment is affected by competitors from outside your country. Scores of 1 and 2 were classified as low, a score of 3 as moderate, and scores of 4 and 5 as high.

Appendix 2: Values Associated to Trellis Figures

Table A21: Use of E-Commerce Technologies in Europe (see Figure 2)

	Denmark			France			Germany		
Percentage using:	*M.*	*R. & W.*	*B. & F.*	*M.*	*R. & W.*	*B. & F.*	*M.*	*R. & W.*	*B. & F*
E-mail	100%	100%	100%	97%	98%	99%	100%	100%	100%
Website	96%	97%	98%	74%	66%	70%	96%	95%	99%
Intranet	74%	84%	95%	78%	77%	77%	76%	82%	94%
Extranet	35%	48%	61%	50%	25%	42%	43%	41%	45%
EDI	62%	70%	83%	72%	61%	60%	64%	72%	62%
EFT	81%	58%	71%	33%	30%	33%	80%	83%	81%
Call center	28%	44%	53%	31%	42%	41%	35%	52%	66%

M. = Manufacturing, R & W = Retail & Wholesale, B & F = Banking - Finance

Table A22: E-Business Over the Internet in Europe (see Figure 4)

	Denmark			France			Germany		
Percentage using:	*M.*	*R. & W.*	*B. & F.*	*M.*	*R. & W.*	*B. & F.*	*M.*	*R. & W.*	*B. & F*
Advertising and marketing	71%	92%	86%	40%	37%	51%	74%	82%	93%
Making sales online	23%	45%	63%	13%	23%	25%	26%	48%	49%
After sales customer service and support	46%	56%	65%	25%	20%	29%	45%	44%	68%
Making purchases online	75%	71%	80%	29%	22%	32%	55%	59%	41%
Exchanging operational data with suppliers	45%	55%	62%	61%	39%	40%	52%	66%	31%
Exchanging operational data with customers	46%	43%	53%	62%	27%	36%	55%	52%	45%
Integrating business processes	31%	46%	46%	29%	22%	27%	28%	46%	30%

M. = Manufacturing, R & W = Retail & Wholesale, B & F = Banking - Finance

Table A23: Drivers for Internet use- Percent Indicating it as a Significant Driver (see Figure 5)

	Denmark			France			Germany		
	M.	*R. & W.*	*B. & F.*	*M.*	*R. & W.*	*B. & F.*	*M.*	*R. & W.*	*B. & F*
Customers demanded it	45%	47%	55%	22%	13%	22%	34%	26%	46%
Major competitors online	30%	37%	46%	23%	22%	33%	33%	36%	67%
Suppliers required it	24%	17%	15%	11%	7%	9%	22%	15%	3%
To reduce costs	45%	54%	56%	21%	19%	16%	24%	23%	26%
Expand market	38%	42%	44%	26%	23%	34%	38%	38%	37%
Enter new markets	32%	36%	37%	23%	18%	25%	37%	44%	34%
Improve coordination	57%	55%	54%	36%	38%	37%	50%	58%	37%
Gov. procurement	11%	18%	5%	15%	14%	18%	9%	8%	6%
Gov. provided incentives	3%	8%	7%	2%	10%	6%	5%	2%	6%

M. = Manufacturing, R & W = Retail & Wholesale, B & F = Banking - Finance

Table A24: Barriers for Internet use- Percent indicating it as a significant driver (see Figure 7)

	Denmark			France			Germany		
	M.	*R. & W.*	*B. & F.*	*M.*	*R. & W.*	*B. & F.*	*M.*	*R. & W.*	*B. & F.*
Face-to-face	46%	39%	24%	43%	38%	31%	28%	13%	21%
Privacy - security	28%	19%	32%	43%	23%	49%	27%	25%	48%
Customers use	21%	31%	18%	26%	22%	19%	20%	26%	12%
Staff expertise	5%	11%	5%	8%	15%	25%	23%	18%	11%
Costs e-Site	28%	17%	17%	29%	21%	19%	25%	28%	22%
Organizational changes	17%	11%	18%	27%	21%	20%	34%	33%	15%
Business strategy	19%	16%	16%	18%	10%	17%	15%	19%	14%
Access cost	6%	6%	5%	14%	3%	9%	3%	2%	6%
Business laws	11%	14%	7%	28%	19%	29%	16%	3%	19%
Taxation	3%	7%	2%	13%	13%	12%	5%	2%	3%
Legal protection	17%	8%	13%	24%	32%	29%	20%	14%	27%

M. = Manufacturing, R & W = Retail & Wholesale, B & F = Banking - Finance

Table A25: Impacts of Internet use - Percent indicating it as a Significant Driver (see Figure 13)

	Denmark			France			Germany		
	M.	*R. & W.*	*B. & F.*	*M.*	*R. & W.*	*B. & F.*	*M.*	*R. & W.*	*B. & F.*
Internal processes	35%	33%	33%	32%	36%	27%	29%	25%	27%
Staff productivity	21%	21%	20%	19%	19%	14%	16%	18%	15%
Sales	18%	11%	26%	6%	12%	3%	8%	18%	19%
Sales area	19%	15%	19%	23%	14%	15%	14%	23%	17%
Customer service	43%	36%	48%	29%	23%	31%	28%	30%	52%
International sales	12%	7%	4%	13%	8%	4%	13%	12%	3%
Procurement costs	18%	28%	13%	9%	2%	7%	9%	18%	7%
Inventory costs	11%	9%	6%	8%	2%	8%	7%	7%	12%
Coordination with suppliers	28%	34%	30%	28%	31%	20%	33%	22%	21%
Competitive position	25%	25%	33%	15%	19%	13%	25%	22%	38%

M. = Manufacturing, R & W = Retail & Wholesale, B & F = Banking - Finance

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